

A critical review of the genus *Heliophanus* C.L. Koch, 1833, of Middle Asia and the Caucasus (Aranei Salticidae)

Критический обзор рода *Heliophanus* C.L. Koch, 1833 Средней Азии и Кавказа (Aranei Salticidae)

S.Yu. Rakov* & D.V. Logunov**
С.Ю. Раков*, Д.В. Логунов**

* Chair of Invertebrate Zoology, Faculty of Biological and Soil Sciences, Tomsk State University, Leninsky prospekt 36, Tomsk 634010 Russia.

** Кафедра зоологии беспозвоночных, Биолого-почвенный факультет, Томский государственный университет, Ленинский проспект, 36, Томск 634010 Россия.

** Zoological Museum, Institute for Systematics and Ecology of Animals, Siberian Division of the Russian Academy of Sciences, Frunze Street 11, Novosibirsk 630091 Russia.

** Зоологический музей, Институт систематики и экологии животных СО РАН, ул. Фрунзе, 11, Новосибирск 630091 Россия.

KEY WORDS: jumping spiders, fauna, taxonomy, Middle Asia, the Caucasus.

КЛЮЧЕВЫЕ СЛОВА: пауки-скакуны, фауна, систематика, Средняя Азия, Кавказ.

ABSTRACT: The paper presents a revision of the genus *Heliophanus* in the faunas of the Caucasus and Middle Asia. Sixteen species are described and figured, including two new to science: *H. dunini* sp.n. and *H. wesolowskiae* sp.n. Distributional maps for each species are provided as well. The lectotype of *H. turanicus* Kharitonov, 1969, is designated for the first time. *H. ignorabilis* Wesolowska, 1986, is recognized to be a junior synonym of *H. verus* Wesolowska, 1986, rather than of *H. mordax* (O.P.-Cambridge, 1872), as it was supposed earlier. Females of *H. forcipifer* Kulczyński, 1895, and *H. verus* are described for the first time.

Seven species have been excluded from the species lists of the Caucasian and Middle Asian *Heliophanus*: *H. aeneus* (Hahn, 1831), *H. melinus* L. Koch, 1867, *H. minutissimus* Simon, 1871, *H. niveiventris* Simon, 1889, *H. rufithorax* Simon, 1868, *H. simplex* Simon, 1868, and *H. tribulosus* Simon, 1868.

РЕЗЮМЕ: Статья представляет собой ревизию рода *Heliophanus* в фаунах Кавказа и Средней Азии. Описаны и изображены 16 видов, в т.ч. два, новые для науки: *H. dunini* sp.n. и *H. wesolowskiae* sp.n. Для каждого вида даны также карты распространения. Впервые выделен лекотип для *H. turanicus* Kharitonov, 1969. Выяснено, что *H. ignorabilis* Wesolowska, 1986 является младшим синонимом *H. verus* Wesolowska, 1986, а не *H. mordax* (O.P.-Cambridge, 1872), как предполагали ранее. Впервые описаны самки *H. forcipifer* Kulczyński, 1895 и *H. verus*. Семь видов исключены из списков кавказских и среднеазиатских видов

рода: *H. aeneus* (Hahn, 1831), *H. melinus* L. Koch, 1867, *H. minutissimus* Simon, 1871, *H. niveiventris* Simon, 1889, *H. rufithorax* Simon, 1868, *H. simplex* Simon, 1868 и *H. tribulosus* Simon, 1868.

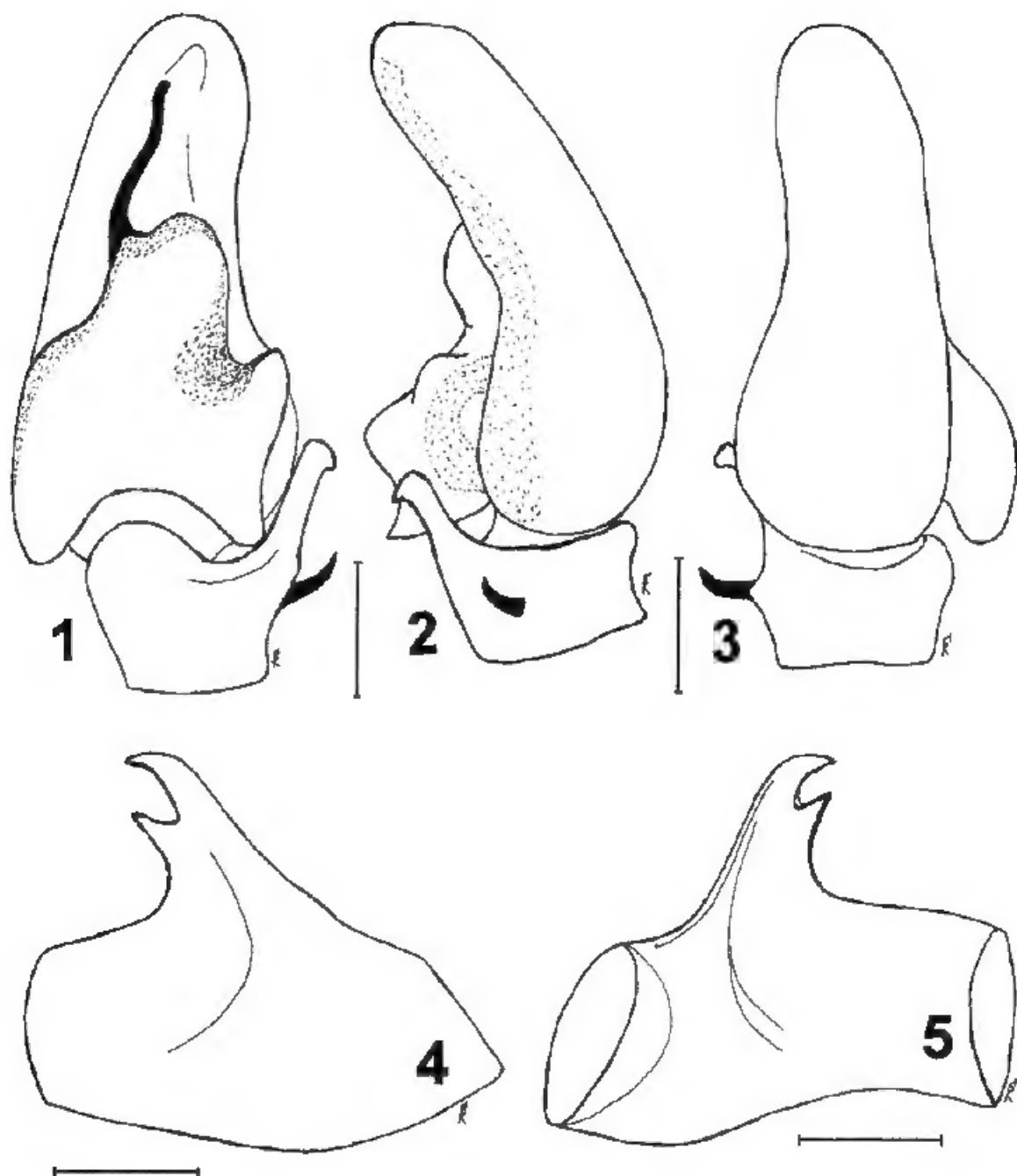
Introduction

To the moment, about 125 valid species have been described in the spider genus *Heliophanus* [see Prószyński, 1990], of which 22 have hitherto been reported in the faunas of the Caucasus and Middle Asia [Nenilin, 1984a, 1985]. Seven of these records are here recognized as either erroneous or requiring confirmation upon pertinent material (see below). According to the current data, 16 valid species occur in the areas under study, all of them being treated below.

Material and methods

The work is based on museum collections and material newly taken from the Caucasus and Middle Asia. A total of 849 specimens of *Heliophanus* have been (re-)examined.

Specimens for this study have been borrowed from or housed in the following museums: HMNH — the Hungarian Museum of Natural History, Budapest, Hungary; ISE — the Zoological Museum of the Institute for Systematics and Ecology of Animals, Novosibirsk, Russia; PSU — the Zoological Department of the Perm State University, Perm, Russia; SVO — personal collection of Mr. S.V. Ovtchinnikov, Bishkek, Kyrgyzstan; ZISP —



Figs 1-5. *Heliophanus auratus* (C. L. Koch, 1835): 1 — σ^7 palp, ventral view; 2 — ditto, lateral view; 3 — ditto, dorsal view; 4 — palpal femur, lateral view; 5 — ditto, median view. Scale 0.14 mm.

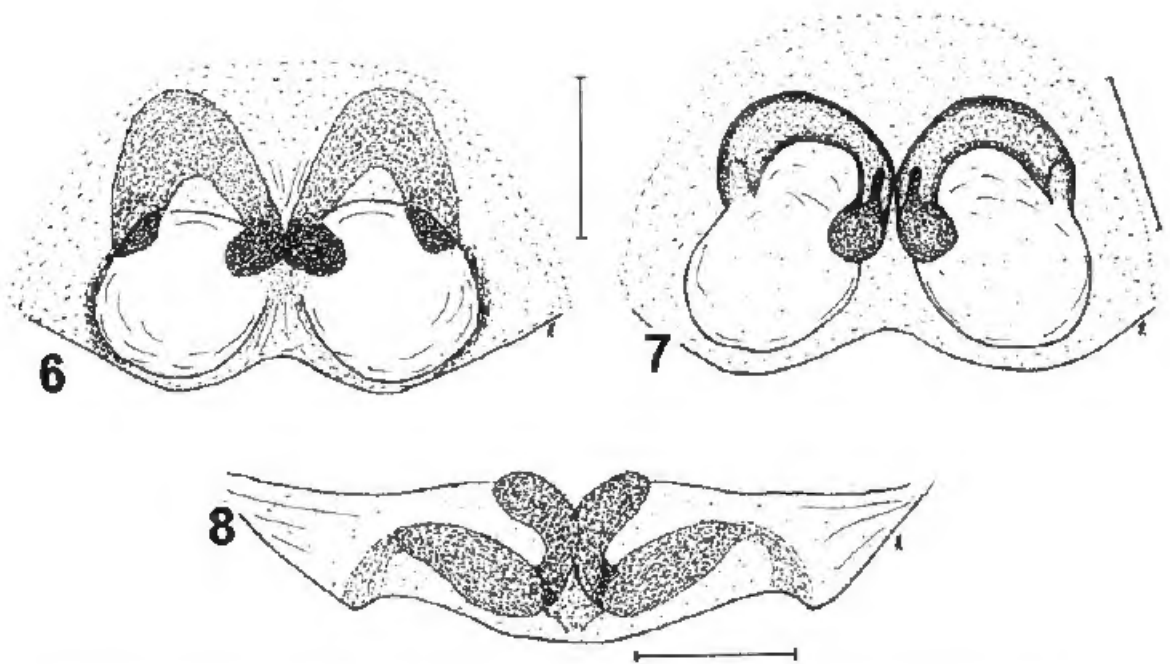
Рис. 1-5. *Heliophanus auratus* (C. L. Koch, 1835): 1 — палепа σ^7 , вентрально; 2 — то же, латерально; 3 — то же, дорсально; 4 — бедро палепы, латерально; 5 — то же, медиально. Масштаб: 0,14 мм.

the Zoological Institute of the Russian Academy of Science, St. Petersburg, Russia; ZMMU — the Zoological Museum of the Moscow State University, Moscow, Russia.

Since this paper is a regional review, not a complete revision, of the genus *Heliophanus*, relevant literature for each species mentioned includes only the sources concerning the spider fauna of the

territories under study. For a complete list of taxonomic work on this genus, see Harm [1971], Wesolowska [1986] and Prószyński [1990].

In most cases, the names of collectors are abbreviated as follows: Dr. V.V. Dubatolov (V.D.), Dr. P.M. Dunin (P.D.), Dr. D.V. Logunov (D.L.), Mr. O.V. Lyakhov (O.L.), Mr. D.A. Milko (D.M.), Dr. V.I. Ovtsharenko, Mr. S.V. Ovtchinnikov



Figs 6-8. *Heliophanus auratus* (C. L. Koch, 1835): 6 — epigyne; 7 — spermathecae, dorsal view; 8 — ditto, rear view. Scale: 0.14 mm.

Рис. 6-8. *Heliophanus auratus* (C. L. Koch, 1835): 6 — эпигина; 7 — сперматека; 8 — то же, вид сзади. Масштаб: 0,14 мм.

(S.O.), Dr. S.L. Zonshtein (S.Z.), Dr. A.A. Zyuzin (A.Z.).

Abbreviations used in the figures and text are as follows: ap. — apically; d. — dorsally; Fm — femur; Mt — metatarsus; pr. — prolaterally; Pt — patella; rt. — retrolaterally; Tb — tibia; v. — ventrally. For leg spination, the system adopted is that used by Ono [1988]. The sequence of leg segments in measurement data is the following: femur + patella + tibia + metatarsus + tarsus. All measurements are in mm.

Heliophanus C.L. Koch, 1833

Generic synonymy: See Wesolowska [1986: 5].

Type species: *Salticus aeneus* Hahn, 1831, by subsequent designation [Simon, 1901].

Remarks. The definition and diagnosis of the genus *Heliophanus* have been adequately given by Harm [1971] and Wesolowska [1986].

Survey of species

Heliophanus auratus C.L. Koch, 1835 Figs 1-9.

H. auratus: Nenilin, 1984a: 17; 1984b: 136; 1985: 130; Savchenko, 1990: 173; Mikhailov & Fet, 1994: 517; Zonshtein, 1984: 148; Dunin, 1979: 38; 1984: 58; 1989: 38; Dunin & Mamedov, 1992: 57; Prószyński, 1979: 308; Minoranski et al., 1984: 77.

H. nigriceps: Kulczyński, 1895: 6; Spassky & Shnitnikov, 1937: 294.

Material. KRASNODAR PROVINCE: 1 ♂ (ZMMU),

Elisavetskoye, 27.08.1982, E. Prokofyeva — AZERBAIJAN: 2 ♀♀ (ZISP), Lankaran, Hyrcan Reserve, 20-21.06.1985, P.D.; 1 ♂ (ZISP), Khachmas, 22.09.1986, P.D.; 7 ♀♀ (ISE), Nakhichevan, Shakhbuz Distr., Bichenek, 1900 m alt., 13.07.1988, P.D.; 1 ♂, 1 ♀ (ISE), Saatly, Dzhabarkhan, 22-29.06.1982, A. Mamedov; 2 ♀♀ (ISE), same locality, 30.05.1978, P.D. — ARMENIA: 1 ♀ (ISE), Town Sevan, 31.07.1983, D.L.; 1 ♂ (ZISP), Megri Distr., Niuvari, 25.04.1983, V. Yanushev. — KAZAKHSTAN: 2 ♀♀ (ISE), "Shazyn riverside", 43°35'N, 79°18'E, 13.06.1993, D.M.; 2 ♂♂, 2 ♀♀ (ZMMU), 2 ♂♂, 3 ♀♀ (ISE), environs of Pavlodar, Irtysh River Valley, 20.06.1994, O.L.; 4 ♀♀ (ISE), Pavlodar Area, Mayskoe Distr., Lake Koktas, 8.05.1990, O.L.; 1 ♂ (ISE), same area, Bayanaul Distr., Kyzyl-Tau, 12.06.1991, O.L.; 1 ♂, 2 ♀♀ (ISE), 20 km S of Pavlodar, Zarya, 17.06.1992, O.L.; 1 ♂ (ZISP), Akmolinsk, Lake Kurchaldzhyno, 06.1929, S. Spassky; 2 ♀♀ (ZISP), Semirechie, S. Spassky's Collection. — KYRGYZSTAN: 1 ♂ (ZISP), Kirghizskii Mt. Range, Tacyr, 25.06.1986, S.O.; 1 ♂ (ISE), Sary-Chelok Reserve, 28.05.1993, D.M.; 1 ♀ (ISE), Lake Issyk-Kul, Chon-Uryukty River, 1700-2500 m alt., 24.06.1993, D.M.; 1 ♀ (ZMMU), same locality, Cholpon-Ata, 15.06.1978, S.Z.; 1 ♀ (ISE), Dzhanghi-Pakhta, 10.06.1986, S.O.; 1 ♂ (ISE), Kamyshevka, Chu River, 40 km NNW of Bishkek, 7.05.1985, S.O. — TAJIKISTAN: 1 ♂ (ISE), Dushanbe, 12.07.1991, S.O. — UNCERTAIN LOCALITIES: 1 ♀ (ISE), Bymburovo (?), 17.08-6.09.1991, coll. ?

Diagnosis. The ♀ of *H. auratus* is close to that of *H. potanini* (see comments in "Diagnosis" under *H. potanini*), while the ♂ is similar to that of *H. flavipes*, *H. aeneus* Hahn, 1831, and *H. melinus* L. Koch, 1867. From *H. flavipes*, the ♂ differs in the place of origin of the embolus as well as by the shape of the tegulum (cf. Figs 1 and 67), from *H. aeneus* by the presence of a bifurcated femoral process [cf. Wesolowska, 1986: fig. 612], and from *H. melinus* by both the structure of the femoral process of the palp and the dorsal abdominal coloration (*H. auratus* lacks a pair of longitudinal stripes) [cf. Wesolowska, 1986: figs 741-747].

Distribution. This Euro-Siberian species has been described from Armenia as *H. nigriceps* [Kulczyński,

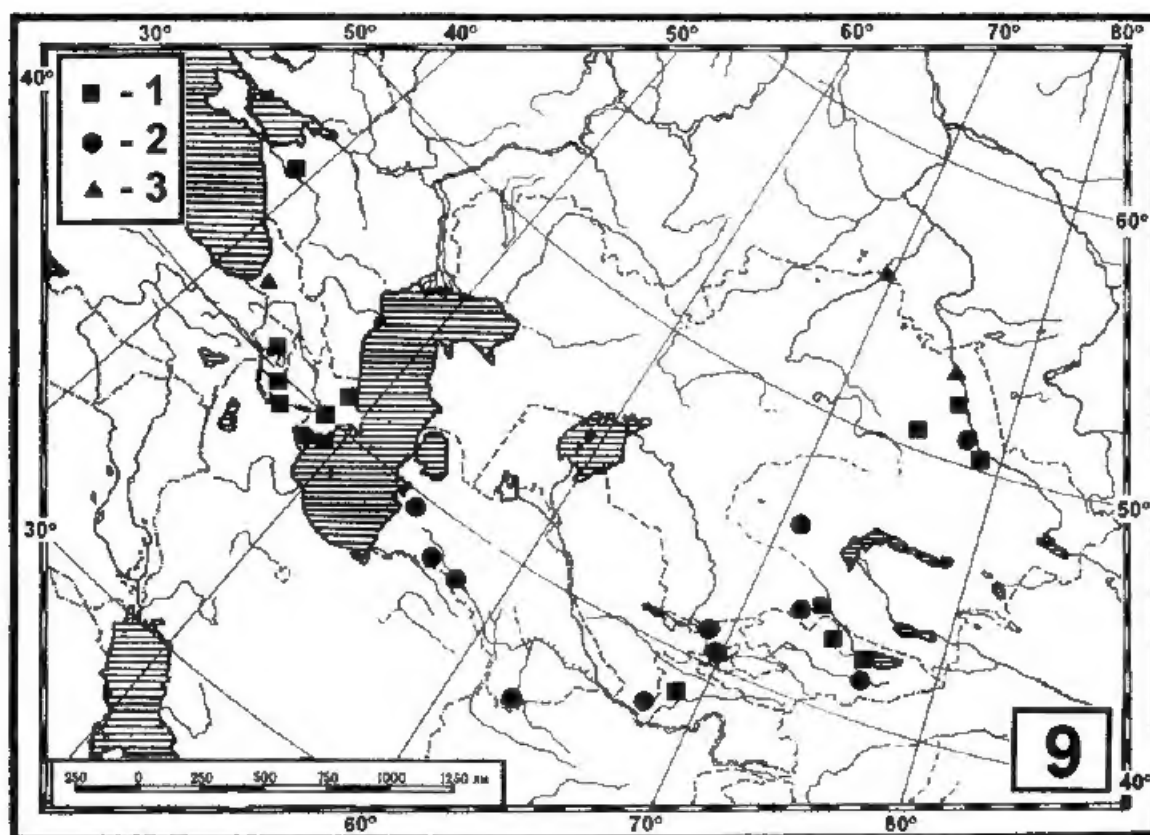


Fig. 9. Localities of *H. auratus* (1), *H. curvidens* (2) and *H. dubius* (3) in the Caucasus and in Middle Asia.

Рис. 9. Местонахождения *H. auratus* (1), *H. curvidens* (2) и *H. dubius* (3) на Кавказе и в Средней Азии.

1895] and then reported under this name from both the Caucasus: Khosta [Spassky, 1937], and Middle Asia [Spassky & Shnitnikov, 1937]. Later, *H. auratus* was reported from Kyrgyzstan: Cholpon-Ata, Ferganskii and Chatkalskii mt. ranges [Nenilin, 1984b; Zonshtein, 1984]; E- and S-Kazakhstan: Almaty, Tarbagatai [Spassky & Shnitnikov, 1937; Prószyński, 1979; Tarabaev, 1979; Nenilin, 1984a; Savlieva, 1970, 1976, 1979, 1990]; Turkmenistan: Murgab [Prószyński, 1979; Nenilin, 1984a; Mikhailov & Fet, 1994]; Uzbekistan: Urgut, Samarkand, Tashkent [Kroneberg, 1875; Nenilin, 1984a]; Azerbaijan [Dunin, 1979, 1984, 1989; Dunin & Mamedov, 1992]; and Chechnya [Minoranskii et al., 1984; Minoranskii, 1988]. All localities of *H. auratus* in Middle Asia and in the Caucasus are shown in Fig. 9.

Description. MALE. Measurements. Carapace 2.25 long, 1.50 wide, 0.75 high at PLE. Ocular area 0.08 long, 1.20 wide anteriorly and 1.35 wide posteriorly. Diameter of AME 0.38. Abdomen 2.25 long, 1.50 wide. Cheliceral length 0.75. Length of leg segments: leg I: 1.25 + 0.75 + 0.87 + 0.62 + 0.58; leg II: 1.00 + 0.50 + 0.75 + 0.58 + 0.50; leg III: 1.13 + 0.50 + 0.62 + 0.78 + 0.60; leg IV: 1.38 + 0.58 + 0.87 + 0.73 + 0.62. Leg spination. Leg I: Fm d.1-1-1; Tb pr.0-1, v.1-1; Mt v.2-2. Leg II: Fm d.1-1-1; pr.1ap.; Tb pr.0-1, v.1-1; Mt v.2-2ap. Leg III: Fm d.1-1-1, pr. and rt.1ap.; Tb pr.1-1, rt.1-1-1, v.1-2ap.; Mt d.2-2ap., pr. and rt.1ap., v.1-2ap. Leg IV: Fm d.1-1-1, pr. and rt.1ap.; Tb pr.1-1, rt.1-1-1, v.1-2ap.; Mt d.1-2-2ap., pr. and rt.1ap., v.1-2ap. Coloration typical for *Heliophanus*. Abdomen grey, dorsum covered with white hairs anteri-

orly. Legs orange with brownish femora, with femora I being darkest. Palpal structure as in Figs 1-5.

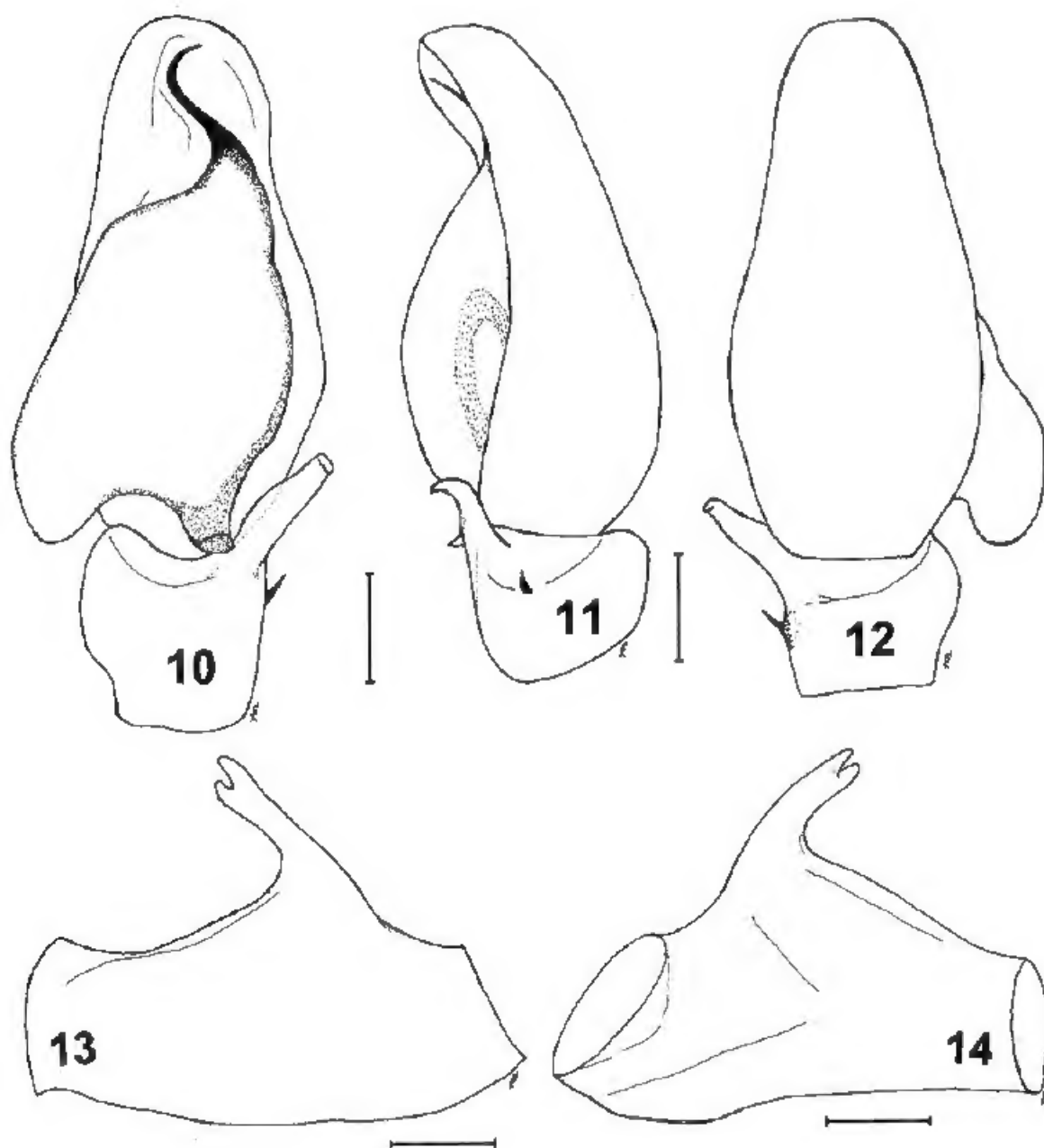
FEMALE. Measurements. Carapace 2.25 long, 1.45 wide, 1.00 high at PLE. Ocular area 0.85 long, 1.20 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.38. Abdomen 3.50 long, 2.15 wide. Cheliceral length 0.65. Length of leg segments: leg I: 1.00 + 0.60 + 0.62 + 0.58 + 0.45; leg II: 0.87 + 0.45 + 0.50 + 0.50 + 0.47; leg III: 0.90 + 0.50 + 0.60 + 0.80 + 0.45; leg IV: 1.25 + 0.50 + 0.75 + 0.87 + 0.50. Leg spination. Leg I: Fm d.1-1-1; Tb pr.0-1, v.1-1; Mt v.2-2. Leg II: Fm d.1-1-1; Tb pr.0-1, v.1-1; Mt v.2-2ap. Leg III: Fm d.1-1-1, pr.1ap.; Tb rt.1-1, v.1-1ap.; Mt d.1-2ap., pr. and rt.1ap., v.2ap. Leg IV: Fm d.1-1-1; Tb pr.1-1, rt.1-1-1, v.1-2ap.; Mt d.1-2-2ap., pr. and rt.1ap., v.1-2ap. Coloration. Carapace grey to brownish, sparsely covered with white hairs. Abdomen grey, covered with white scales dorsally and laterally. Legs light yellow, but femora and patellae brownish. Palp yellow with a brown patella. Epigyne and spermathecae as in Figs 6-8.

Heliophanus chovdensis Prószyński, 1982 Figs 10-21.

Heliophanus chovdensis Prószyński, 1982: 283, fig.34.

H. c.: Wesolowska, 1986: 222, figs 775, 888.

Material. KAZAKHSTAN: 2 ♂♂ (ZMMU), Almaty Area, Kurtinsk Distr., Aidarly, 23.05.1981, C. Tarabaev; 1 ♂ (ISE), same area and district, Aizaran, 23.05.1981, E. Taranov; 1 ♂ (ZISP), same locality, Basoi Tereskan, 11.09.1982, E. Taranov; 2 ♂♂, 1



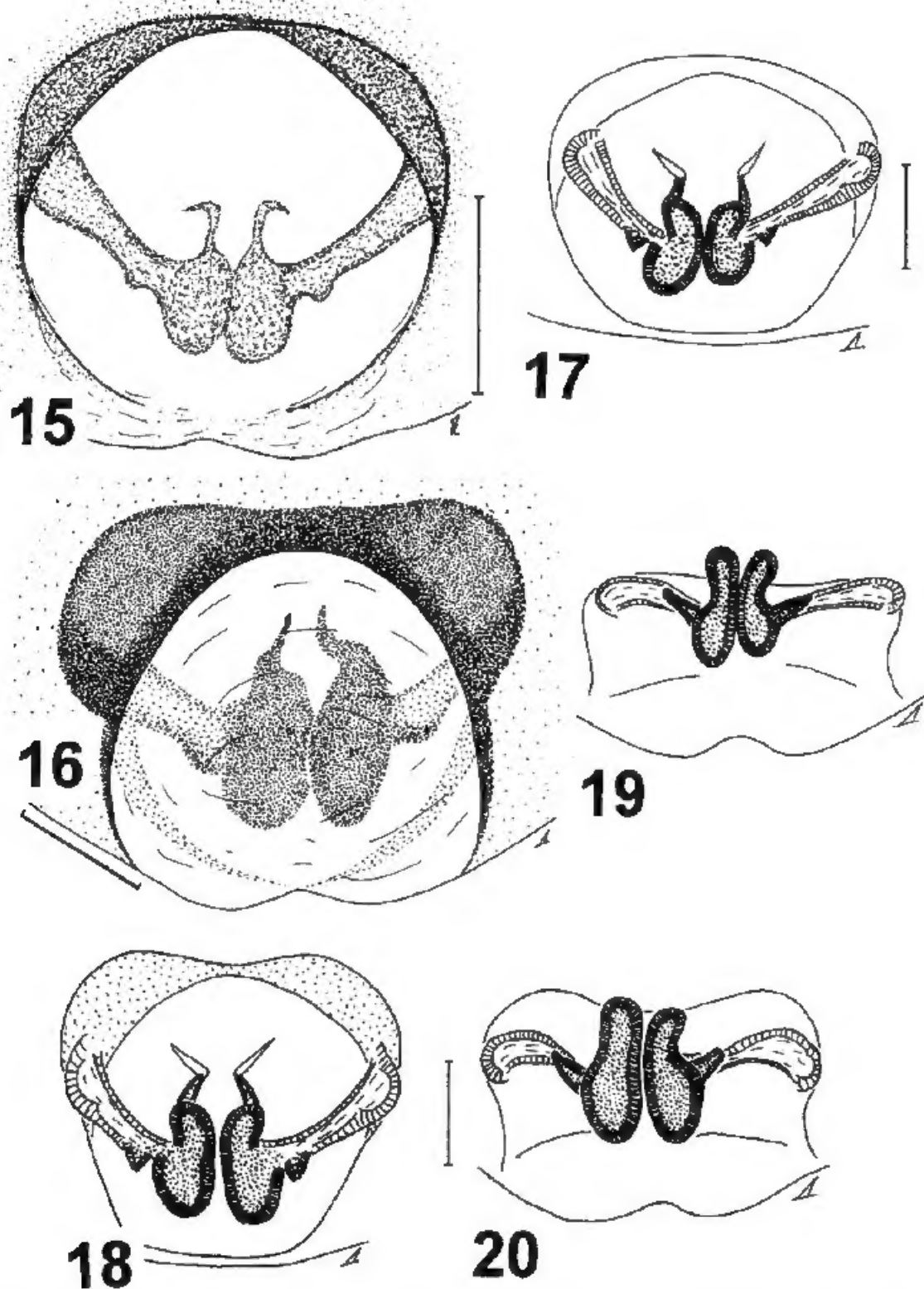
Figs 10-14. *Heliophanus chowdensis* (Prószyński, 1982): 10 — ♂ palp, ventral view; 11 — ditto, lateral view; 12 — ditto, dorsal view; 13 — palpal femur, lateral view; 14 — ditto, median view. Scale: 0.14 mm.

Рис. 10-14. *Heliophanus chowdensis* (Prószyński, 1982): 10 — палепа ♂, вентрально; 11 — то же, латерально; 12 — то же, дорсально; 13 — бедро палепы, латерально; 14 — то же, медиально. Масштаб: 0,14 мм.

♀ (ISE), same area, Talgar Distr., Kapchagai, 27.08.1992, D.L. & Y.M. Marusik; 1 ♂ (ISE), 11.09.1990, A.Z. & A. Fedorov; 1 ♂, 1 ♀ (ZMMU), same district, Kapchagaiskoye Reservoir, 11.09.1990, A.Z. & A. Fedorov; 1 ♂ (ZMMU), same area, Zarechinyi, 13.04.1989, S.I. Ibraev & A.A. Raikhanov; 1 ♀ (ZMMU), S-Kazakhstan Area, Arys Distr., 35 km W of Dostyk, Bairkum, Kyzylkum Desert, 21.05.1993, B.E. Kopytkbaev & A.I. Ponomarenko; 1 ♂, 7 ♀♀ (ISE), Balkhash Distr., 24 km SE of Bakanas, 28.05.1995, A.Z.; 1 ♂ (ISE, 2003), same district, Bakanas, 15.09.1988, S. Ibraev & A.Z.; 1 ♀ (ISE, 118), Taldy-Kurgan Area, 63th road-km from Ush-Tobe to Akzhar, Irnazar, summer 1988, A.Z.; 1 ♀ (ISE), Zhambyl (= Dzhambul) Area, Chu River, near

Town Chu, 20.06.1989, A.Z. & C. Tarabaev; 1 ♂, 1 ♀ (ISE), same area and district, Gheorghievka, 22.05.1984, S.O.; 1 ♀ (ISE), same area, Moynkum Distr., 21 km S of Furmanovka, Moynkum Desert, 16.05.1992, A.Z. & A. Fedorov; 1 ♂ (ISE), same locality, 16.05.1983, Y.M. Marusik; 1 ♂ (ZMMU), same locality, 19.09.1983, Y.M. Marusik; 1 ♂ (ISE, 1982), 153rd road-km from Almaty to Karaganda, 5.05.1988, M.V. Zarko. — KYRGHYZSTAN: 1 ♀ (ISE), Inner Tian-Shan, E part of Susamyr-Too Mt. Range, middle flow of Kokomeran River, 21.06.1991, S.Z.

Comparative material Holotype of *H. chowdensis*: 1 ♀ (HMNH, Nr. 626), Mongolia, Chevd Aimak, 10 km NW of Somon Ulene, 1500 m alt., 4.07.1966, Exp. Kaszab.



Figs 15-20. *Heliophanus chovdensis* (Prószyński, 1982): 15-16 — epigyne; 17-18 — spermathecae, dorsal view; 19-20 — ditto, rear view. 15-19 — holotype from Chovd Aimak, Mongolia. Scale: 0.14 mm.

Рис. 15-20. *Heliophanus chovdensis* (Prószyński, 1982): 15-16 — эпигина; 17-18 — сперматека; 19-20 — то же, вид сзади. 15-19 — голотип из Ховд-Аймака, Монголия. Масштаб: 0,14 мм.

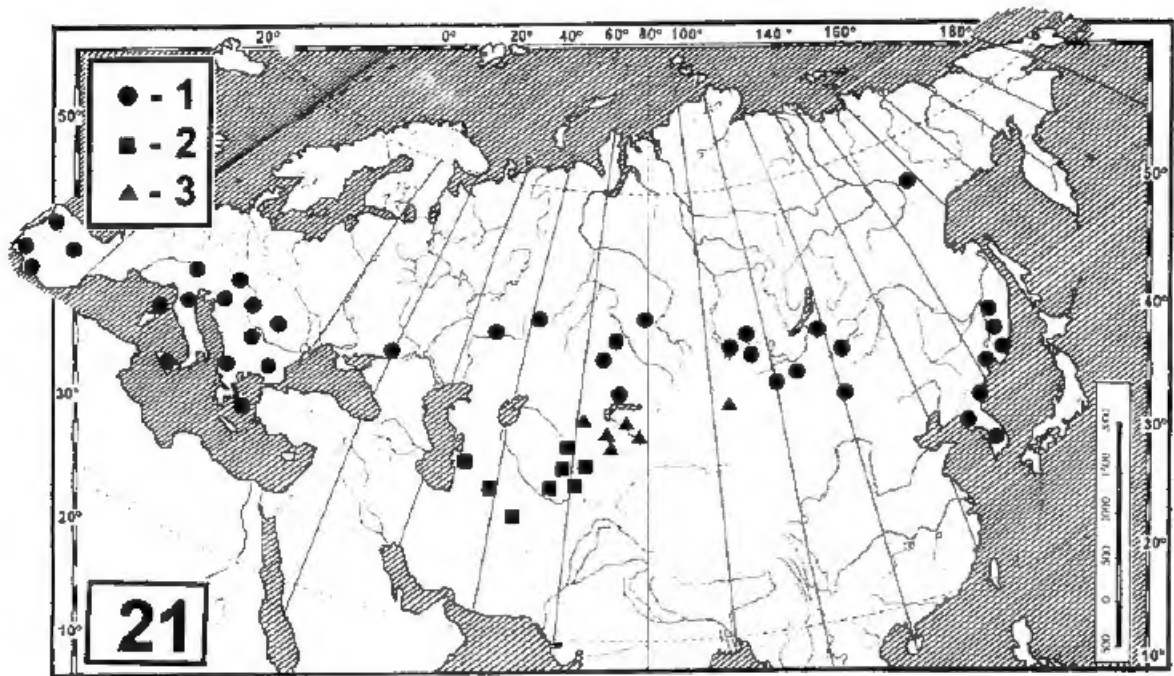


Fig. 21. Localities of *H. lineiventris* (1), *H. turanicus* (2) and *H. chovdensis* (3) in Eurasia.

Рис. 21. Местонахождения *H. lineiventris* (1), *H. turanicus* (2) и *H. chovdensis* (3) в Евразии.

Diagnosis. *H. chovdensis* is most closely related to *H. turanicus* Kharitonov, 1969, and *H. lineiventris* Simon, 1868, and, in most cases, both ♂♂ and ♀♀ can be separated only when compared side-by-side, directly. The ♂ of *H. lineiventris* differs from that of other closely related congeners by the longest (spiniform) additional tibial apophysis (Figs 97-99). The ♂ of *H. chovdensis* and *H. turanicus* can be separated by the shape of the curved embolus (cf. Figs 10 and 132). Among these species, the ♀ of *H. chovdensis* is the easiest to be distinguished, differing in the position of the insemination ducts which originate from the anterior edge of the epigynal depression and are usually visible through the integument at the bottom of the depression as a pair of tubes sloping toward each other (Figs 15-20). The ♀ of *H. lineiventris* and *H. turanicus* are poorly distinguishable. The latter species seems to differ in displaying a more transverse depression of the epigyne (Figs 28, 30) and wider insemination ducts (Figs 55-58).

Distribution. This Kazakhstan-West Mongolian species (Fig. 21) has hitherto been known from the type locality only: Mongolia, Chovd Aimak, Somon Uenc [Prószyński, 1982].

Description. MALE. Carapace 2.25 long, 1.74 wide and 1.10 high at PLE. Abdomen 2.25 long, 1.60 wide. Cheliceral length 0.75. Ocular area 1.00 long, 1.10 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.35. Length of leg segments: leg I: 1.36 + 0.75 + 0.75 + 0.75 + 0.63; leg II: 1.25 + 0.65 + 0.62 + 0.88 + 0.60; leg III: 1.38 + 0.68 + 0.84 + 0.70 + 0.65; leg IV: 1.38 + 0.62 + 1.06 + 1.10 + 0.70. Leg spination. Leg I: Fm d.1-1-1ap., pr.1ap.; Tb pr.0-1, v.1-2ap.; Mt v.2-2ap. Leg II: Fm d.1-1-1ap., pr.1ap.; Tb pr.0-1, v.1-2ap.; Mt v.2-2ap. Leg III: Fm d.1-1-1ap., pr.1ap.; Tb pr. and rt.1-1, v.2ap.; Mt d.2-2ap., pr. and rt.1 ap., v.1-2ap. Leg IV: Fm d.1-1-1,

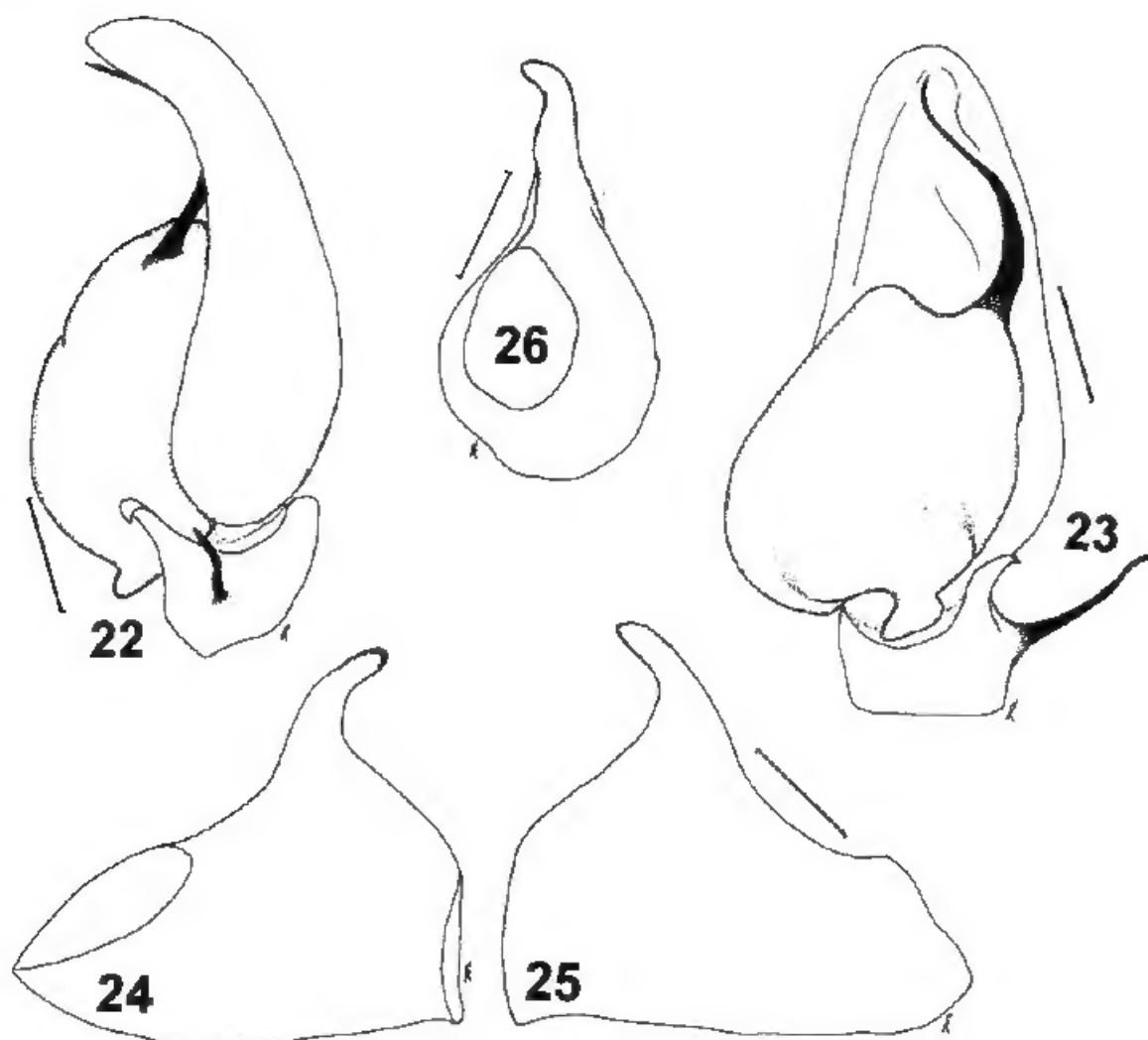
pr.1ap.; Tb pr.1-1, rt.1-1-1, v.1-2ap.; Mt d.2-2ap., pr. and rt.1ap., v.2ap. Coloration. Carapace dark brown, bordered by a line of white scales. Eye field black. Sternum and labium grey. Maxillae light brown. Chelicerae dark brown. Abdomen grey. Dorsum with five white spots, venter with a pair of white patches in front of spinnerets. Legs brown with yellow metatarsi. Palpal structure as in Figs 10-14.

FEMALE. Carapace 2.00-2.50 long, 1.50-1.94 wide and 0.85-1.00 high at PLE. Abdomen 2.25-4.00 long, 1.66-3.00 wide. Cheliceral length 0.65-0.85. Ocular area 0.90-0.95 long, 1.10-1.25 wide anteriorly and 1.14-1.15 wide posteriorly. Diameter of AME 0.35. Length of leg segments: leg I: 1.02 + 0.53 + 0.65 + 0.60 + 0.50; leg II: 0.81 + 0.53 + 0.50 + 0.54 + 0.48; leg III: 1.09 + 0.49 + 0.51 + 0.75 + 0.53; leg IV: 1.38 + 0.50 + 1.05 + 1.08 + 0.62. Leg spination. Leg I: Fm d.1-1-1ap., pr.1ap.; Tb pr.0-1, v.2-2ap.; Mt v.2-2ap. Leg II: Fm d.1-1-1ap., pr.1ap.; Tb pr.1-1, v.1-1; Mt v.2-2ap. Leg III: Fm pr.1ap., d.1-1-1; Tb pr. and rt.1-1, v.1ap.; Mt d.1-2ap., pr. and rt.1ap., v.1-2ap. Leg IV: Fm d.1-1-1; Tb pr. and rt.1-1, v.1-2ap.; Mt pr. and rt.1ap., d.1-2ap. Coloration as in male, but carapace lacking a cover of white scales, and legs lighter. Abdomen: Dorsum grey, with a white anterior band and a pair of white spots in back part thereof; venter with a median longitudinal stripe of white scales and a pair of white patches in front of spinnerets. Palpal femora brown, remaining palpomeres yellow. Epigyne and spermathecae as in Figs 15-20.

Heliophanus cupreus (Walckenaer, 1802)

Figs 22-27, 31-32, 35.

H. c.: Ovtsharenko, 1978: 683; Dunin, 1979: 38; 1984: 58; 1989: 38; Kharitonov, 1932: 178-179; Prószyński, 1976: map 82;



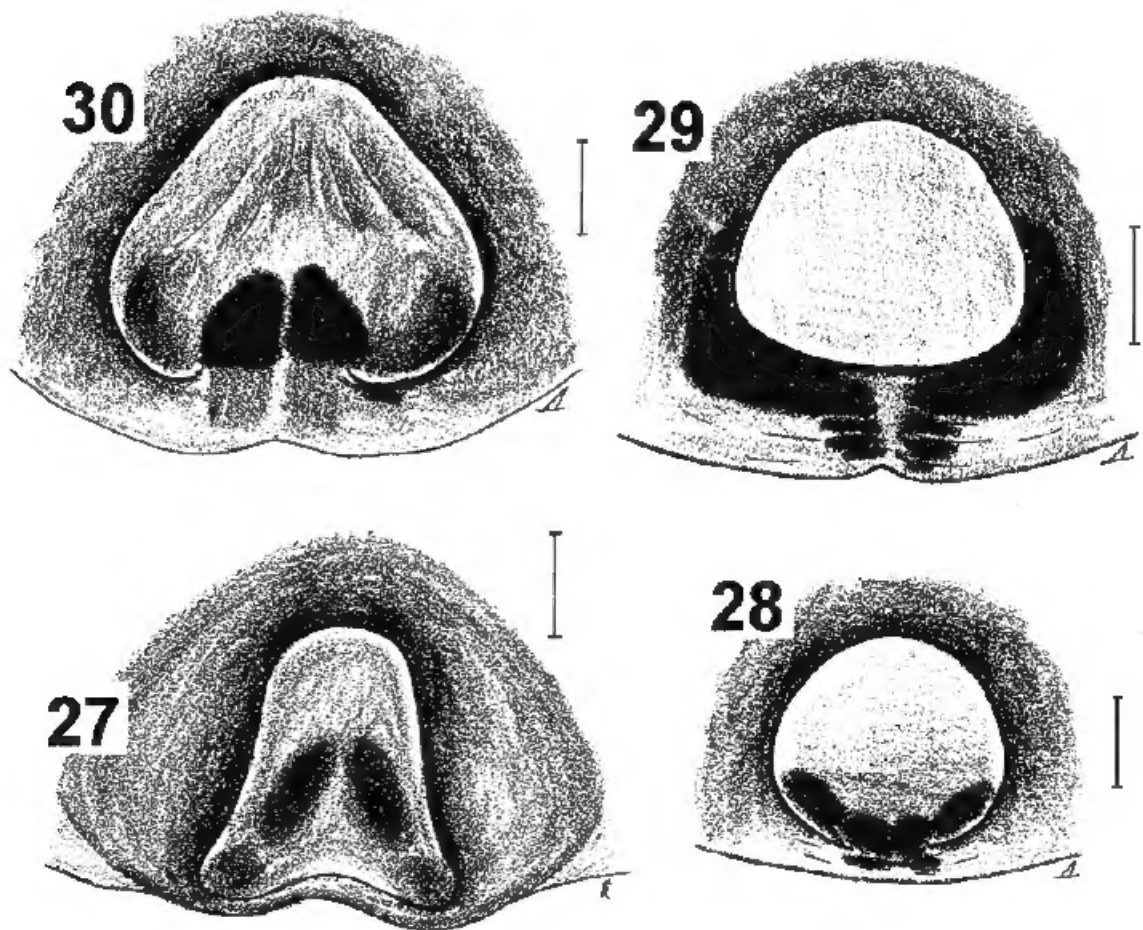
Figs 22-26. *Heliophanus cupreus* (Walckenaer, 1802): 22 — ♂ palp, lateral view; 23 — ditto, ventral view; 24 — palpal femur, lateral view; 25 — ditto, median view; 26 — ditto, proximal view. Scale: 0.14 mm.

Рис. 22-26. *Heliophanus cupreus* (Walckenaer, 1802): 22 — палепа ♂, латерально; 23 — то же, вентрально; 24 — бедро палепа, латерально; 25 — то же, медиально; 26 — то же, вид проксимально. Масштаб: 0,14 мм.

Minoranskii et al., 1984: 77; Wesolowska, 1986: 215-216, figs 671-683, 894.

Material. CRIMEA: 1 ♀ (ZMMU), Bakhchisaray, Kuibyshevo, 14.08.1981, V.A. Bragina; 3 ♂♂, 2 ♀♀ (ISE), 1 ♂ (ZISP), same locality, 5-26.06.1993, S.V. Vasilenko; 2 ♂♂ (ISE), Belogorsk Distr., Karasiovka, 30.05-3.06.1981, V.A. Bragina; 3 ♂♂, 1 ♀ (ZMMU), Simferopol' Distr., Krasnolese, 11.07.1981, V.A. Bragina; 1 ♂ (ISE), Mar'ian Peninsula, 21.07.1981, V.A. Bragina. — KRASNODAR PROVINCE: 4 ♂♂, 6 ♀♀ (ISE), 6 ♀♀ (ZISP), Caucasian State Reserve, Guzeripol, 800-1500 m alt, 13-29.07.1974, V.O.; 6 ♂♂, 14 ♀♀ (ZISP), 1 ♂, 9 ♀ (ISE), same locality, 13.06-20.07.1976, V.O.; 1 ♂ (ZMMU), same locality, 13.06.1991, K.G. Mikhailov; 3 ♀♀ (ZISP), same locality, Aishkho Mt., 1800-1900 m alt, 18.07-16.08.1976, V.O.; 1 ♂ (ZISP), same locality, Pseashkho Mt., 17.07.1976, V.O.; 1 ♂ (ZISP), same locality, Krasnaya Polyana, 500 m alt, 26.08.1976, V.O.; 2 ♂♂, 6 ♀♀ (ZISP), Maikop, 8-9.06.1976, V.O.; 2 ♀♀ (ZISP), Khosta, 13.06.1976, V.O.; 2 ♂♂, 1 ♀ (ZISP), same locality, 17.06.1975, V.O.; 3 ♀♀ (ZISP), Adler, 28.07.1976, V.O. — NORTH OSSETIA: 1 ♀ (ZMMU), Canyon Tsei, Tsei River, 20.06.1981, S.K. Alekseev; 1 ♀ (ZMMU), Buron, Canyon Kasarskoye, Uistsa, 18.06.1981, S.K. Alekseev; 1 ♂ (ZMMU), Alaghir, 28.06.1985, K.G. Mikhailov. — KABARDINO-

BALKARIA: 1 ♀ (ZMMU), Teberda State Reserve, Teberda River Valley, 1300 m alt, 1.07.1986, I.M. Marova; 1 ♂, 2 ♀♀ (ZISP), Cheghet Mt., 2200 m alt, 3.07.1976, V.O. — GEORGIA: 3 ♀♀ (ZISP), Lagodekhi Reserve, 7.01.1982, Y.M. Marusik. — AZERBAIJAN: 1 ♀ (ZISP), Lenkoran, 10.06.1984, P.D.; 7 ♂♂, 2 ♀♀ (ISE), 3 ♂♂, 6 ♀♀ (ZISP), Lenkoran Distr., Gaftoni, 4.05-20.06.1985, P.D.; 4 ♂♂, 13 ♀♀ (ISE), 4 ♀♀ (ZMMU), 1 ♂, 5 ♀♀ (ZISP), same distr., Hynan Reserve, 16-28.06.1983, D.L.; 1 ♀ (ISE), same locality, 20.06.1985, P.D.; 2 ♀♀ (ZMMU), 16.08.1983, P.D.; 3 ♀♀ (ZMMU), same distr., Osakiuja, 10.05.1985, P.D.; 2 ♀♀ (ISE), Baku, 6.06.1989, P.D.; 1 ♂, 5 ♀♀ (ZMMU), Apsheron Distr., Altyagach, 1000 m alt, 19.09.1979, P.D.; 1 ♂, 7 ♀♀ (ISE), 7 ♀♀ (ZMMU), Sheki Distr., 5-10 km N of Sheki, Ghilarsen-Ghilarsen, 1000 m alt, 24-26.06.1978, P.D.; 11 ♂♂, 8 ♀♀ (ISE), 6 ♂♂, 4 ♀♀ (ZMMU), 4 ♂♂, 3 ♀♀ (ZISP), 20-25 km NE of Shemakha, Pirkuli Reserve, 1100-1500 m alt, 23.05-4.08.1984, D.L.; 1 ♂ (ZMMU), Zakataly Reserve, 1000 m alt, 15-16.06.1986, K.G. Mikhailov; 1 ♂ (ZMMU), Dzhar, Chiliban Mt Range, 200 m alt, 8.07.1981, P.D.; 2 ♂♂, 5 ♀♀ (IZE), Khachmas Distr., Nabran, 7-14.07.1976, P.D.; 1 ♂, 4 ♀♀ (ZMMU), same distr., Yalama, 13.06.1978, P.D.; 2 ♀♀ (ISE), Kuba Distr., Kacheresh, 19.06.1976, P.D.



Figs 27-30. Epigynes of *H. cupreus* (27), *H. lineiventris* (28), *H. dunini* (29) and *H. turanicus* (30). Scale: 0.1 mm.
Рис. 27-30. Эпигины *H. cupreus* (27), *H. lineiventris* (28), *H. dunini* (29) и *H. turanicus* (30). Масштаб: 0,1 мм.

Diagnosis. See comments in "Diagnosis" under *H. dunini*.

Distribution. This European (s.l.) species [Wesolowska, 1986: fig. 894; Prószyński, 1976: map 82] has hitherto been reported from the Caucasus: Georgia [Spassky 1937; Mkhelidze, 1964], Chechnya [Minoranskii et al., 1984; Minoranskii, 1988], the western parts of the Caucasus Major [Ovtsharenko, 1978], with Azerbaijan [Dunin, 1979, 1984, 1989] obviously representing the easternmost limit of *H. cupreus* distribution. All localities of *H. cupreus* in the Caucasus are shown in Fig. 35.

Habitat. The species seems to be restricted to swamps, grassy meadows and glades, as well as to birch forests.

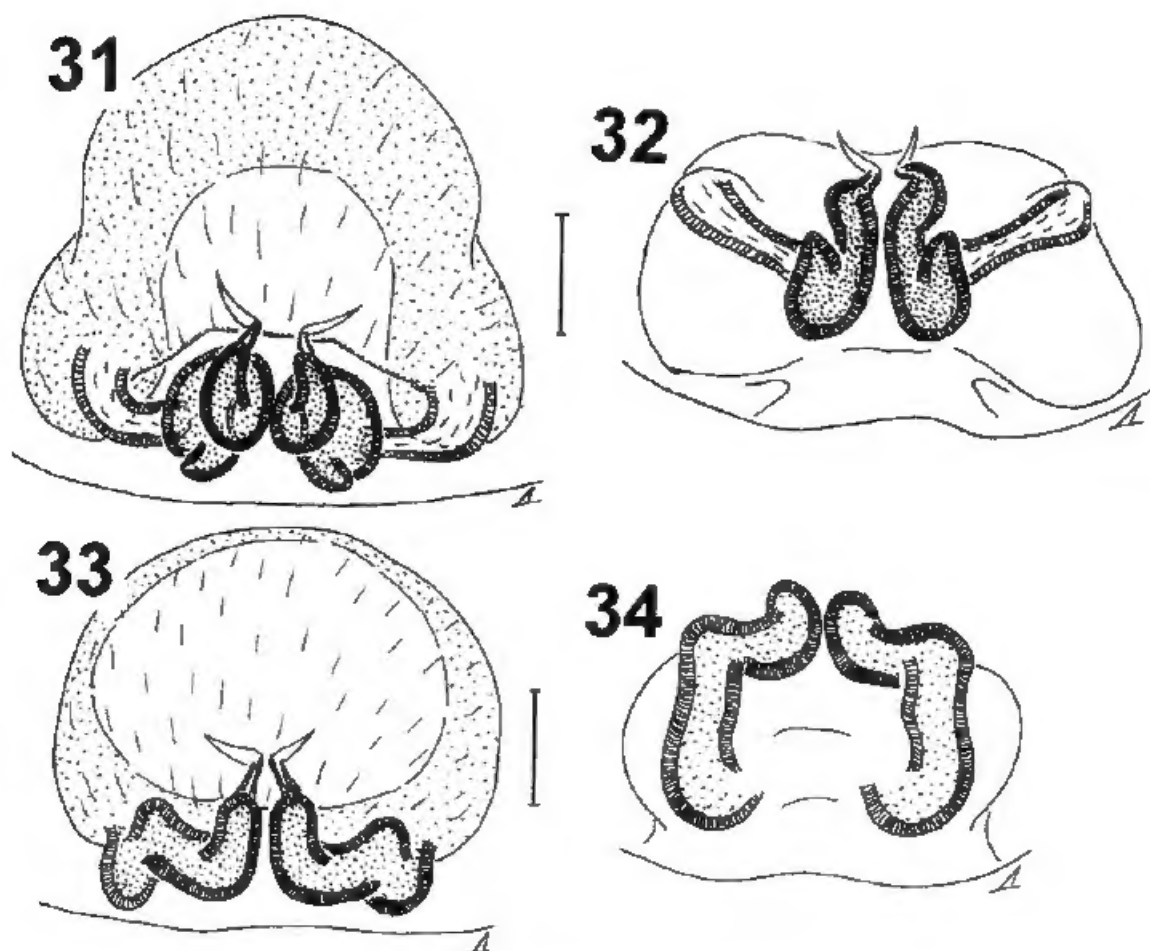
Description. MALE. Measurements. Carapace 1.74 long, 1.25 wide, 0.90 high at PLE. Ocular area 0.85 long, 1.00 wide anteriorly and 1.06 wide posteriorly. Diameter of AME 0.48. Abdomen 2.00 long, 1.25 wide. Cheliceral length 0.94. Length of leg segments: leg I: $0.87 + 0.50 + 0.75 + 0.50 + 0.43$; leg II: $0.62 + 0.43 + 0.50 + 0.62 + 0.50$; leg III: $0.75 + 0.36 + 0.50 + 0.62 + 0.36$; leg IV: $1.00 + 0.36 + 0.75 + 0.75 + 0.50$. Leg spination. Leg I: Fm d.1-1-1; Tb pr.0-1, v.2-2; Mt v.2-2ap. Leg II: Fm d.1-1-1; Tb v.1-1; Mt v.2-2ap. Leg III: Fm d.1-1-1; Tb pr.0-1, rt.1-1-1, v.1ap.; Mt d.2ap., pr. and rt.1ap., v.1-2. Leg IV: Fm d.1-1-1; Tb pr.0-1, rt.1-1-1, v.1ap.; Mt d.2-2ap., pr. and rt.1ap., v.1-2ap. Coloration as in ♂, but legs yellow with brown spots. Palpal femora yellow. Sternum grey. Maxillae and labium brown. Dorsum bordered anteriorly and on sides by a white line. Epigyne and spermathecae as in Figs 27, 31-32.

v.1-1ap. Coloration typical for *Heliophanus*. Carapace dark brown. Eye field black. Sternum, labium, maxillae and chelicerae brown. Legs orange, with pro- and retrolateral longitudinal brown lines. Abdomen grey. Palpal structure as in Figs 22-26.

FEMALE. Measurements. Carapace 2.30 long, 1.50 wide, 1.00 high at PLE. Ocular area 0.85 long, 1.06 wide anteriorly and 1.10 wide posteriorly. Diameter of AME 0.35. Abdomen 3.00 long, 2.00 wide. Cheliceral length 0.94. Length of leg segments: leg I: $0.94 + 0.50 + 0.75 + 0.62 + 0.50$; leg II: $0.87 + 0.50 + 0.62 + 0.50 + 0.50$; leg III: $1.00 + 0.45 + 0.62 + 0.75 + 0.62$; leg IV: $1.20 + 0.42 + 1.00 + 1.13 + 0.84$. Leg spination. Leg I: Fm d.1-1-1; Tb v.2-2; Mt v.2-2ap. Leg II: Fm d.1-1-1; Tb v.1-1; Mt v.2-2ap. Leg III: Fm d.1-1-1; Tb pr.0-1, rt.1-1-1, v.1ap.; Mt d.2ap., pr. and rt.1ap., v.1-2. Leg IV: Fm d.1-1-1; Tb pr.0-1, rt.1-1-1, v.1ap.; Mt d.2-2ap., pr. and rt.1ap., v.1-2ap. Coloration as in ♂, but legs yellow with brown spots. Palpal femora yellow. Sternum grey. Maxillae and labium brown. Dorsum bordered anteriorly and on sides by a white line. Epigyne and spermathecae as in Figs 27, 31-32.

Heliophanus curvidens (O. P.-Cambridge, 1872)
Figs 9, 36-42.

H. c.: Nentlin, 1984a: 17; 1985: 130; Logunov, 1992: 66;



Figs 31-34. Spermathecae of *H. cupreus* (31-32) and *H. kochi* Simon, 1868 (33-34): 31, 33 — dorsal view; 32, 34 — vent view. Scale: 0.1 mm.

Рис. 31-34. Сперматеки *H. cupreus* (31-32) и *H. kochi* (33-34): 31, 33 — вид дорзально, 32, 34 — вид вентрально. Масштаб: 0.1 мм.

Zyuzin & Tarabaev, 1994: 400; Mikhailov & Fet, 1994: 517; Wesolowska, 1996: 29.

H. berlandi: Prószyński, 1976: map 74.

Material. AZERBAIJAN: 2 ♀♀ (ISE), Lerik Distr., Zuvand, Gosmalian, 1300 m alt., 21.07.1983, D.L.; 1 ♀ (ZMMU), Lenkoran Distr., Gaftoni, 2000 m alt., 19.07.1980, S. Dashdamirov; 3 ♂♂, 1 ♀ (ISE), same locality, 13.05.1985, P.D. — KAZAKHSTAN: 2 ♂♂, 3 ♀♀ (ISE), Almaty Area, Kapchagai, 10.05.1986, A.Z.; 2 ♂♂ (ISE), Pavlodar Area, Mayskoe Distr., Tundyk, 31.06.1990, O.L.; 1 ♀ (ZMMU), S-Kazakhstan Area, 102 km NW of Bairkum, 28.05.1993, A.Z.; 3 ♂♂ (ISE), Zhambyl (= Dzhambul) Area, Sarysuk Distr., 4-76 km N of Ulanbel, Betpak-Dala Desert, 4.05.1990, A. Fedorov; 1 ♂ (ISE), same locality, 4.10.1991, A.Z. & A. Fedorov; 1 ♂ (ISE), same area, Gheorghievka, 22.05.1984, S.O. — UZBEKISTAN: 1 ♂ (ZISP), Surkhadaryinskaya Area, Kubitangtau Mt. Range, Bazar-Dara, 1500 m alt., 7.05.1984, S.Z.; 2 ♂♂, 1 ♀ (ZMMU), same area and range, Kumpyr-Tepa, 15.05.1984, A.V. Tanasevitch; 1 ♂ (ZISP), Tashkent Area, Charvakskoye Reservoir, 11.05.1981, A.B. Nenilin. — TURKMENISTAN: 1 ♀ (ZISP), Bakharden Distr., Zhdanova Kolkhoz, 21.06.1977, V.Y. Fet; 30 ♂♂, 1 ♀ (ISE), 10 km S of Bakharden, 3.04.1993, D.L.; 2 ♂♂ (ISE), Badkhyz Reserve, Canyon Kyzyl-Dzhar, 10.04.1993, D.L.; 2 ♂♂ (ISE), SW Kopetdagh, Kara-Kala, 29.03.1993, D.L. & S.O.; 3 ♂♂, 1 ♀ (ISE), same locality, 3.04.1993, A.Z.; 4 ♂♂, 1 ♀ (ISE), 8 km NE of Nebit-Dag, Bolshoi Balkhan Mts., 380-1000 m alt., 1-2.04.1993, D.L. & A.Z.; 5 ♂♂, 2 ♀♀ (ISE), 40 km SE of Polekhatum, Zulfagarskii Mt. Range, 1000 m alt.,

14.04.1993, D.L.; 7 ♂♂, 1 ♀ (ISE), 20-25 km SE of Polekhatum, Ghezhgadyk Mt. Range, 500-1000 m alt., 16.04.1993, D.L.; 1 ♂, 2 ♀♀ (ISE), Firyuza, 5.04-1.05.1991, V.D.; 1 ♂ (ISE), Ashkhabad, 14.04.1991, V.D. & V.K. Zinchenko; 1 ♀ (ZMMU), Kulitangtau Mt. Range, W slope, Dzhelau Plateau, Airi-Baba Mt., 2000-2300 m alt., 04.1991, V.D.; 1 ♂, 5 ♀♀ (ISE), same range, Kara-Belent Mrs., 14-19.04.1991, V.D.; 1 ♂, 2 ♀♀ (ISE), same range, Bazar-Tepe, 13-19.05.1991, V.D.; 1 ♂ (ISE), same range, Khodzhaipil, 1000 m alt., date ?, S.O. — TAJIKISTAN: 3 ♂♂ (ISE), Kurgan-Tyube Area, Ilychevsk Distr., Aktau Mt. Range, Gandzhino, 15-19.04.1986, S.O. & S.Z.; 4 ♂♂ (ISE), same locality, 17.03-20.04.1991, S.O.; 1 ♀ (ZISP), same area, Karatau Mt. Range, 17-18.05.1986, S.Z., 1 ♀ (ZMMU), Leninabad, 27-30.06.1959, A.P. Rasnitsyn. — KYRGHYZSTAN: 1 ♀ (ISE), Susamyrtov Mt. Range, 3-8 km SW of Kyzyl-Oi, Kobuksu River Valley, summer 1993, D.M.; E part of Kirghizskii Mt. Range, Orlovka, 16.06.1992, S.O.; 1 ♂ (ZISP), NW part of Kirghizskii Mt. Range, Alash, 26.05.1993, D.M.; 1 ♀ (ISE), Chu Valley, Kok-Dzhar, 28.05.1985, S.O.; 2 ♀♀ (ISE), Talas Area, Toktogul Distr., 25 km NE of Kara-Kul Mt., Pass Kok-Bel, ca. 1500 m alt., 26.06.1992, A.Z. & A. Fedorov; 1 ♀ (ISE), Narynski Mt. Range, Sapkyntor, 15.07.1987, S.O.; 1 ♀ (ISE), Issyk-Kul Area, Lake Kara-Kul, 1600 m alt., 15.08.1984, S.O.

Diagnosis. *H. curvidens* differs from all Central Asian congeners by the presence of a short pointed protuberance on the tegulum (arrowed in Fig. 36) and by the narrow transverse hole of the epigyne (Fig. 41).

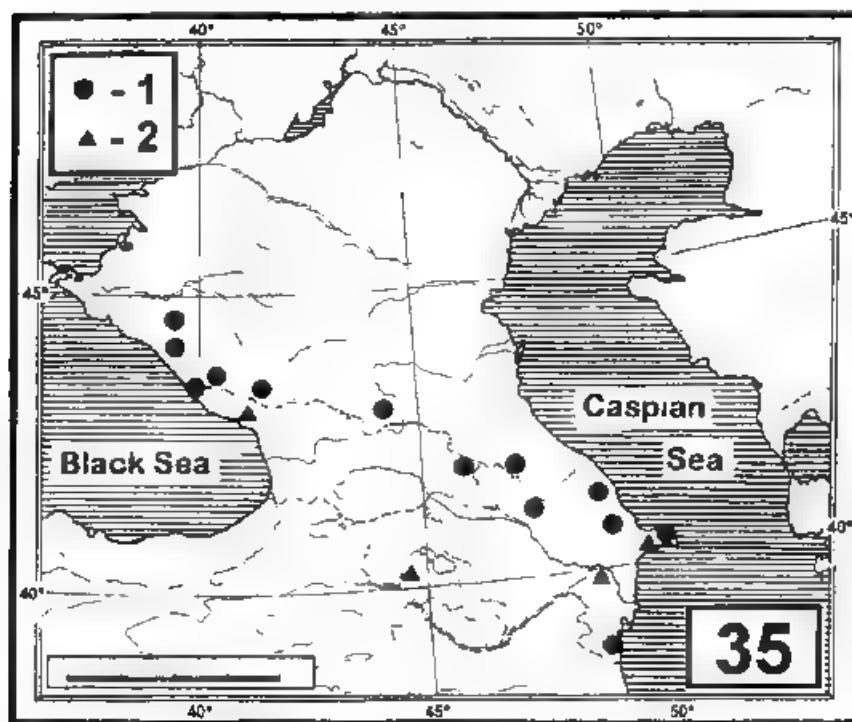


Fig. 35. Localities of *H. cupreus* (1) and *H. equester* (2) in the Caucasus

Рис. 35. Местонахождения *H. cupreus* (1) и *H. equester* (2) на Кавказе

Distribution. The species' distribution covers a narrow subboreal area ranging from the Near East in the west to W China (Gansu and Karakorum (China-Pakistan border)) in the east [s. Wesolowska, 1986: 884]. *H. curvidens* has hitherto been reported from Turkmenistan (Bakharden, Bolshoi Balkhan and Sakka [Mikhailov & Fet, 1994; Wesolowska, 1996]), Kazakhstan (Ustyurt Plateau, Malyukum Desert, Semipalatinsk Area (Kokpekti) [Logunov, 1992a; Zvuzin & Tarabaev, 1994]) and Tajikistan [Nenilin, 1984a]. All localities of *H. curvidens* in Middle Asia and in the Caucasus are shown in Fig. 9.

Description. MALE. Measurements. Carapace 1.50-1.69 long, 1.00-1.35 wide, 0.60-0.75 high at PLE. Ocular area 0.50-0.63 long, 0.80-0.90 wide anteriorly and 1.09-1.00 wide posteriorly. Diameter of AME 0.25-0.30. Abdomen 1.50-1.74 long, 1.00-1.10 wide. Chelicera length 0.47-0.53. Length of leg segments: leg I 0.60-0.75 + 0.35-0.37 + 0.50-0.63 + 0.37-0.41 + 0.36-0.39; leg II 0.62-0.68 + 0.38-0.39 + 0.37-0.46 + 0.38-0.40 + 0.35-0.38; leg III 0.75-0.80 + 0.35-0.53 + 0.53-0.63 + 0.59-0.62 + 0.36-0.38; leg IV 0.87-1.00 + 0.32-0.38 + 0.58-0.75 + 0.53-0.75 + 0.49-0.50. Leg spination: Leg I: Fm d 1-1-1, Tb pr 0-1, v 1-2. Mt v 2-2ap. Leg II: Fm d 1-1-1, pr 1ap. Tb pr 0-1, v 1-1. Mt v 2-2ap. Leg III: Fm d 1-1-1, pr. and rt 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap, Mt d 2-2ap, pr. and rt 1ap, v 1-2ap. Leg IV: Fm d 1-1-1, pr. and rt 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap. Mt d 1-2-2ap, pr. and rt 1ap, v 1-2ap. Coloration typical for *Heliophanus*. Legs brown with yellow metatarsi and tarsi. Dorsum brown with three pairs of white spots. Palpal structure as in Figs 36-40.

FEMALE. Measurements. Carapace 1.75 long, 1.25 wide, 0.78 high at PLE. Ocular area 0.70 long, 1.00 wide anteriorly and 1.15 wide posteriorly. Diameter of AME

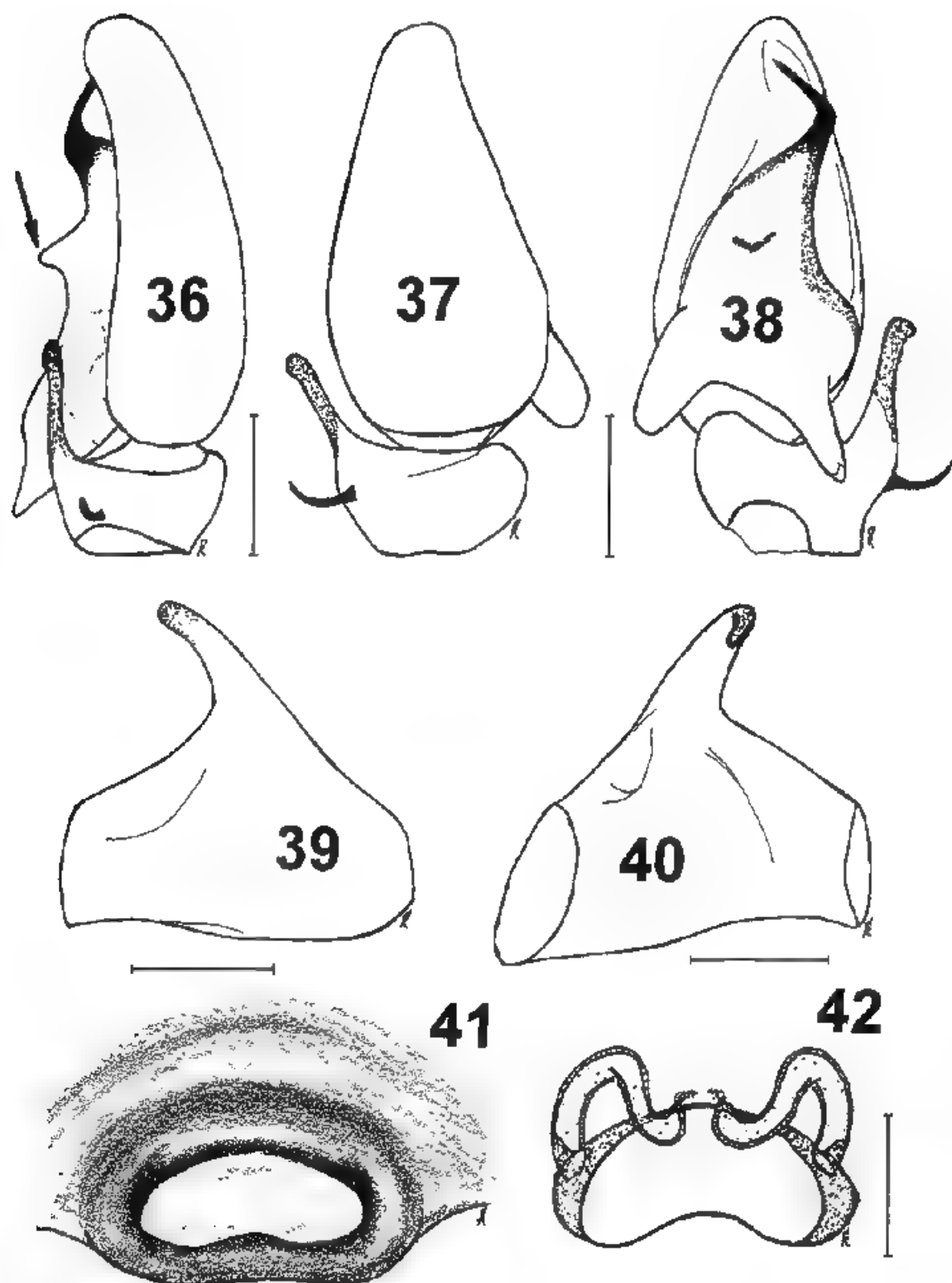
0.30. Abdomen 2.50 long, 1.50 wide. Chelicera length 0.50. Length of leg segments: leg I 0.81 + 0.50 + 0.52 + 0.50 + 0.42; leg II 0.75 + 0.45 + 0.47 + 0.42 + 0.38; leg III 0.78 + 0.47 + 0.52 + 0.62 + 0.50; leg IV 1.13 + 0.50 + 0.87 + 0.90 + 0.50. Leg spination: Leg I: Fm d 1-1-1, Tb pr 0-1, v 1-2. Mt v 2-2. Leg II: Fm d 1-1-1, Tb pr 0-1, v 1-1, Mt v 1-2ap. Leg III: Fm d 1-1-1, pr 1ap, Tb pr 1-1, v 1ap. Mt d 1-2ap, pr. and rt 1ap, v 2ap. Leg IV: Fm d 1-1-1, Tb pr 1-1, rt 1-1-1, v 1-1-2ap, Mt d 2-2ap, pr. and rt 1ap, v 1-2ap. Coloration as in ♂ but legs lighter, and dorsum only with one pair of white spots and bordered anter. only and on sides by a white line. Epigyne and spermathecae as in Figs 41-42.

Heliophanus dubius C. L. Koch, 1835 Figs 9, 43-50

H. d. Nenilin, 1984a: 17-18; Savchenko, 1990: 173; Ovtsharenko, 1978: 683; Duran, 1979: 38; 1984: 58; 1989: 38; Proszynski, 1976: map 73.

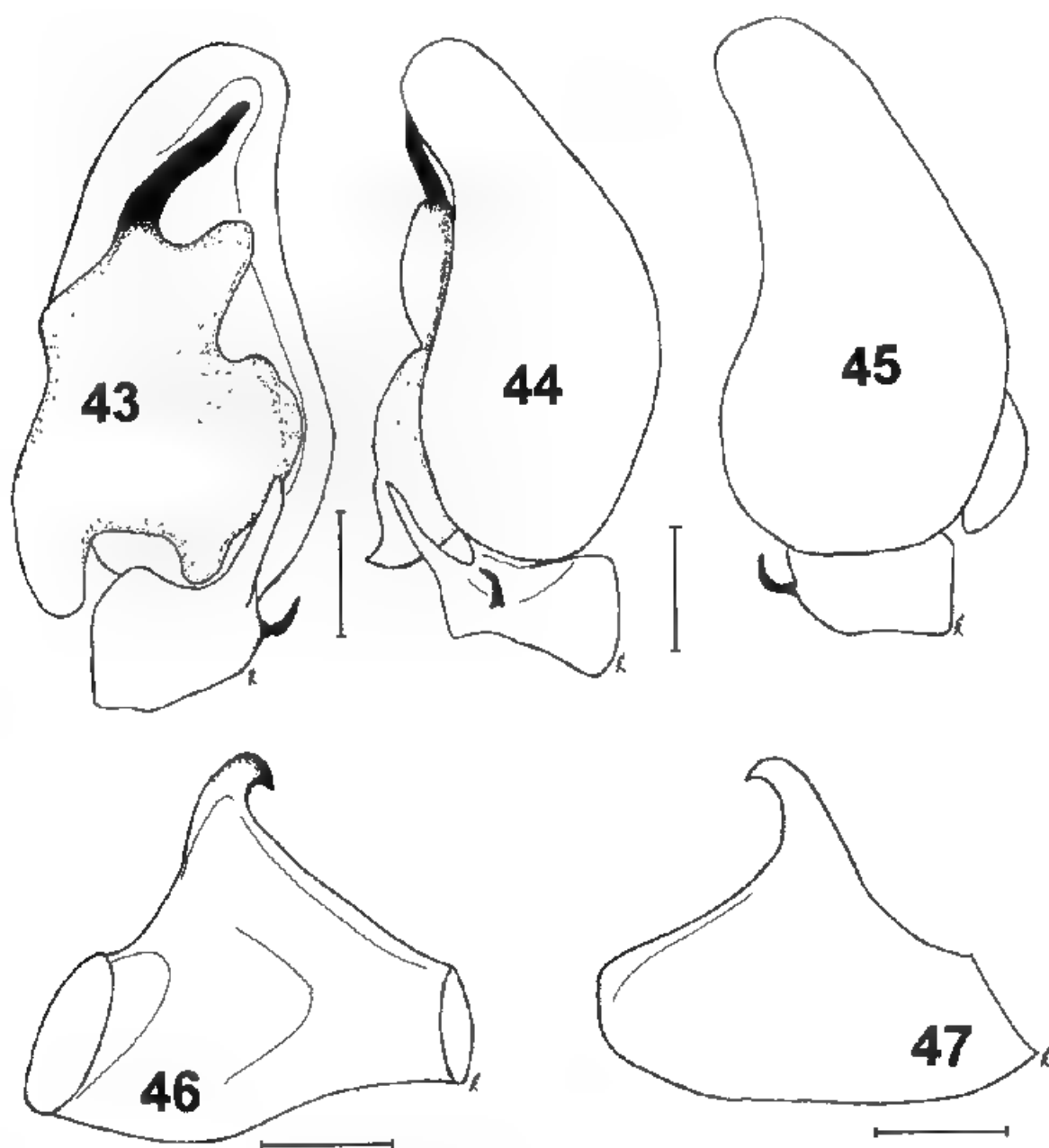
Material. GEORGIA: 1 ♂, 1 ♀ (ZMMU), 15 km W of Adighani, 1500-1700 m alt., 14-15.05.1983, S.I. Golovatch. KAZAKHSTAN: 2 ♂♂ (ISE), N-Kazakhstan Area, Sokolovo Distr., Bolshaya Malyshevka, 15.06.1988, D.L. 1 ♂ (ISE), environs of Pavlodar, Irtysh River Valley, 20.06.1994, O.L.

Diagnosis. The ♂ is extremely similar to that of *H. aeneus*, but differs in having the stronger embolus and the hook-shaped tip of the femoral process [cf. Wesolowska, 1986: 612-615]. The ♀ can be mistaken for that of *H. simplex* Simon, 1868, the latter taxon known from SE-Europe, and that is why *H. dubius* has repeatedly been reported from S-Siberia and C-Asia, e.g. by Savchenko [1970] under the name of *H. simplex*. However, a direct comparison of ♂ of both species [cf. Figs 48-50 and figs



Figs 36-42 *Neopbanus curvidens* (O P-Cambridge, 1872): 36 — ♂ palp, lateral view; 37 — ditto, dorsal view; 38 — ditto, ventral view; 39 — palpal femur, lateral view; 40 — ditto, median view; 41 — epigyne; 42 — spermathecae. Scale 0.14 mm.

Рис 36-42 *Неопбанус курвиденс* (О. Р. Камбридж, 1872): 36 — палепа ♂, вентрально; 37 — то же, дорсально; 38 — то же, вентрально; 39 — бедро палепы, латерально; 40 — то же, медиально; 41 — эпитима; 42 — сперматека. Масштаб 0.14 мм.



Figs 43-47 *Heliophanus dubius* C. L. Koch, 1835: 43 — ♂ palp, ventral view; 44 — ditto, lateral view; 45 — ditto, dorsal view; 46 — palpal femur, median view; 47 — ditto, lateral view. Scale: 0.14 mm.

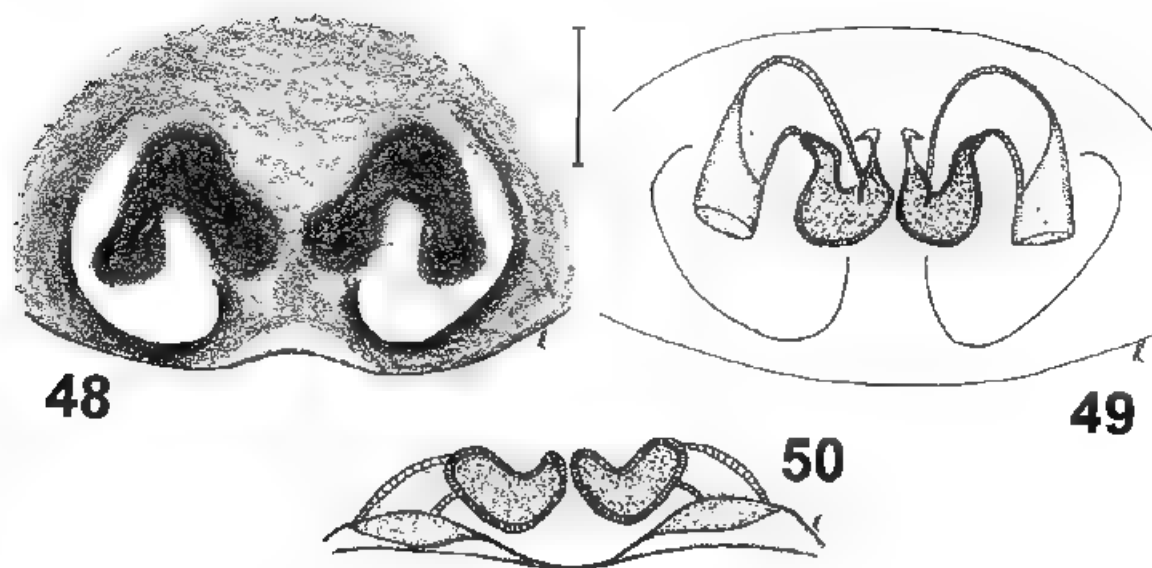
Рис. 43-47. *Heliophanus dubius* C. L. Koch, 1835: 43 — палепа ♂, вентрально; 44 — то же, латерально; 45 — то же дорсально; 46 — бедро самки медиально; 47 — то же, латерально. Масштаб: 0.14 мм.

607-611 in Wesolowska, 1986] always shows small but clear differences in the structure of the genitalia.

Distribution. This trans-Palearctic temperate species has hitherto been reported from E. and S-Kazakhstan [Tarabaev, 1979; Savcheva, 1970, 1979, 1990] and Azerbaijan [Danin, 1979]. All localities of *H. dubius* in Middle Asia and in the Caucasus are shown in Fig. 9.

Habitat. In Georgia, *H. dubius* has been collected in the litter of a mixed coniferous-broadleaved (*Abies*, *Pinus*, *Fagus*, *Acer*) forest.

Description. MALE. Measurements: Carapace 1.74 long, 1.20 wide, 0.70 high at PLE. Ocular area 0.60 long, 0.85 wide anteriorly and 0.94 wide posteriorly. Diameter of AME 0.35. Abdomen 1.74 long, 0.70 wide. Cheliceral length 0.41. Length of leg segments: leg I: 0.80 + 0.38 + 0.51 + 0.45 + 0.20; leg II: 0.75 + 0.35 + 0.38 + 0.41 + 0.41; leg III: 0.75 + 0.20 + 0.45 + 0.45 + 0.38; leg IV: 1.07 + 0.42 + 0.75 + 0.75 + 0.50. Leg spination: Leg I: Fm d 1-1-1, Tb pr 0-1, v 2-2, Mt v 2-2; Leg II: Fm d 1-1-1, Tb pr 0-1, v 1-1, Mt v 2-2 ap; Leg III: Fm d 1-1-1, pr 1 ap, Tb



Figs 48-50. *Heliophanus dubius* C. L. Koch, 1835: 48 — epigyne; 49 — spermathecae, dorsal view; 50 — ditto, rear view. Scale: 0.14 mm.
Рис. 48-50. *Heliophanus dubius* C. L. Koch, 1835: 48 — эпигиния; 49 — сперматека, 50 — то же, вид сзади. Масштаб: 0.14 мм.

pr 1-1, rt 1-1-1, v 1-2ap, Mt d 2ap, pr and rt 1ap, v 1-2ap. Leg IV Fm d 1-1-1, pr 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap, Mt d 1-2ap, pr and rt 1ap, v 1-2ap. Coloration grey to brown, being typical for *Heliophanus*. Legs brown with yellow tarsi. Palpal structure as in Figs 43-47.

FEMALE (from Fomsk). Measurements. Carapace 1.95 long, 1.59 wide, 0.67 high at PLE. Ocular area 0.63 long, 1.06 wide anteriorly and 1.13 wide posteriorly. Diameter of AME 0.37. Abdomen 5.50 long, 1.18 wide. Chelicer length 0.53. Length of leg segments: leg I 0.89 + 0.58 + 0.62 + 0.50 + 0.45, leg II 0.75 + 0.63 + 0.58 + 0.47 + 0.38, leg III 0.89 + 0.50 + 0.58 + 0.75 + 0.20, leg IV 1.06 + 0.50 + 0.87 + 0.87 + 0.50. Leg spination: Leg I Fm d 1-1-1, Tb pr 0-1, v 1-1, Mt v 2-2; Leg II Fm d 1-1-1, Tb pr 0-1, v 1-0, Mt v 2-2ap; Leg III Fm d 1-1-1, Tb rt 0-1, pr 1-1, Mt 5ap; Leg IV Fm d 1-1-1, Tb pr 0-1, v 1ap, Mt d 2-2ap, pr and rt 1ap, v 2ap. Coloration as in ♂, but legs yellow with dorso-lateral longitudinal brown lines and dorsum bordered by a white line anteriorly and on sides. Epigyne and spermathecae as in Figs 48-50.

Heliophanus dunni sp. n.

Figs 51-54, 59-60, 61

H. kochi Pavlenko 1985: 149; Zveznet al. 1994: 7; Dunin 1979: 39 (in part), 1984: 38 (in part); Dunin & Mamedov 1992: 57. All records non Simon, 1868.

Material. Holotype 1♂ (ISE), AZERBAIJAN, Baku, Yasamal-skaya Dohna, 1.10.1977, P.D.

Paratypes. AZERBAIJAN: 3♂♂, 2♀♀ (ISE), 2♂♂, 7♀♀ (ZMMU), together with holotype, 2♀♀, 1♀ (ZMMU), same locality, 16.05.1978, P.D.; 1♂ (ZMMU), same locality, 20.04.1988, P.D.; 1♀ (ZMMU), same locality, 18.05.1976, P.D.; 1♀ (ISE), same locality, 5.07.1989, P.D.; 1♂ (ISE), same locality, 17.10.1987, P.D.; 1♂ (ZMML), Baku, Mardakany, 20.05.1984, P.D.; 1♂, 1♀ (ISE), Lenik Distr., Zuvand, Gosmalian, 1400 m alt., 18.05-28.06.1985, P.D.; 1♂ (ISE), same distr., Zuvand, Raghef, 2300 m alt., 30.06.1985, P.D.; 1♂ (ISE), Sayany Distr., Emikend, 20.05.1985, P.D. — KAZAKHSTAN: 1♀ (ZISP), Aral Sea, Barsakelmes Island,

8.05.1981, T.V. Pavlenko, 1♀ (ZISP), same locality, 3.09.1981, V.V. Shishkina, 1♀ (ZISP), same locality, 22.04.1982, D.D. Pirulin.

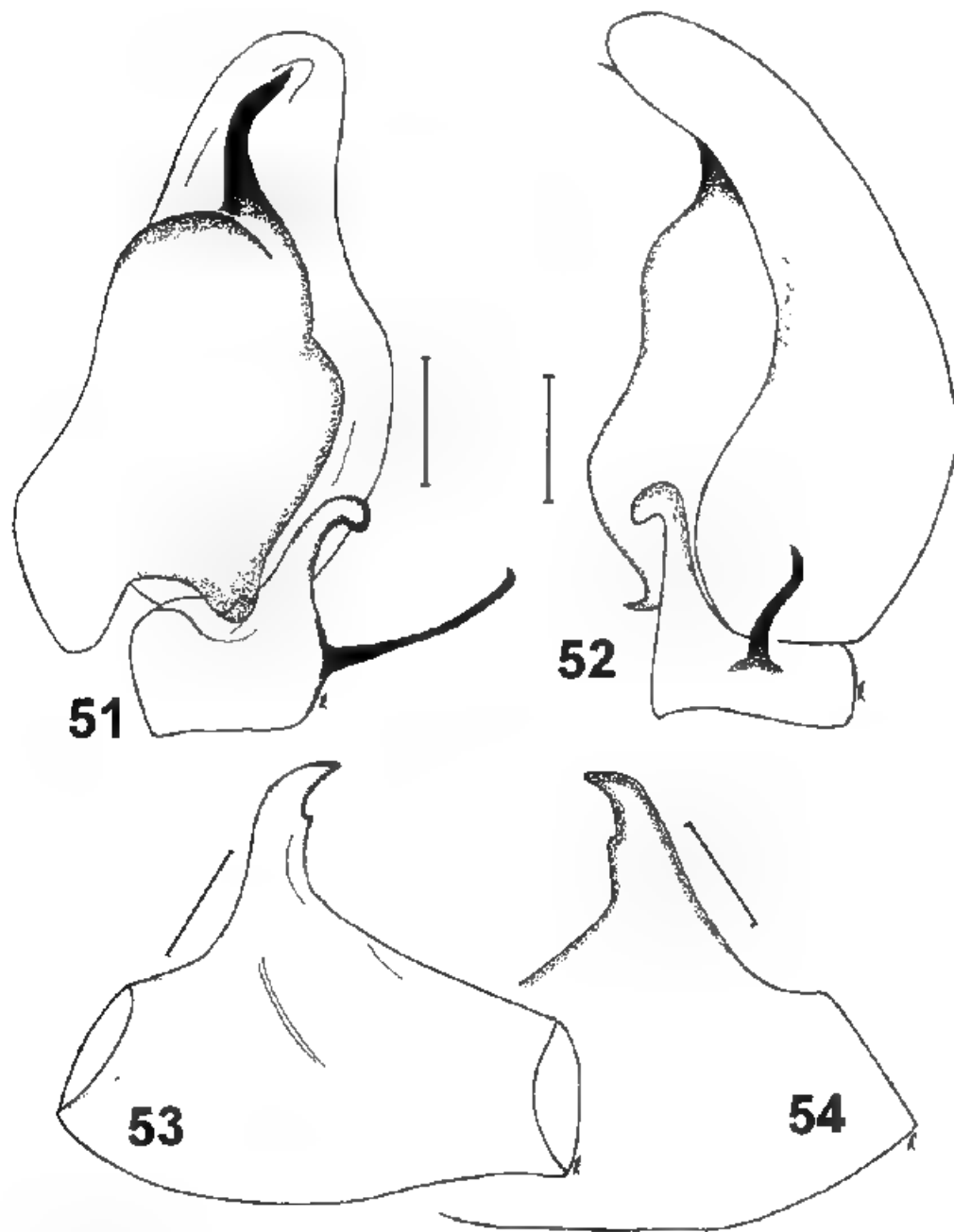
Comparative material. *H. kochi* Simon, 1868 (Figs 33-34): 1♂♂, 2♀♀ (ISE), CR MEA, Bakhchisaray, 5-26.06.1993, S.V. Vasilenko.

Diagnosis. *H. dunni* is closest to *H. cupreus*, but the ♂ can be distinguished by the longer spiniform tibial apophysis (Figs 51-52) and notched femoral process (Figs 53-54); the ♀ differs in the structure of both epigyne (Figs 29) and spermathecae (Figs 59-60). Also, the ♀ of *H. dunni* can be mistaken for that of *H. lineiventris* and *H. kochi*, the most reliable distinctive characters being observed in the spermathecae only (cf. Figs 57-58 and 33-34).

Distribution. The species is currently known from Azerbaijan and Barsakelmes Is. and on v (Fig. 61). It has hitherto been reported from there sub *H. kochi* [Pavlenko, 1985; Dunin, 1979, 1984; Zveznet al., 1994].

Description. **MALE.** Carapace 2.50 long, 1.70 wide and 1.00 high at PLE. Abdomen 2.30 long, 1.74 wide. Chelicer length 0.80. Ocular area 0.75 long, 1.20 wide anteriorly and 1.35 wide posteriorly. Diameter of AME 0.20. Length of leg segments: leg I 1.38 + 0.75 + 1.00 + 0.75 + 0.62, leg II 1.00 + 0.62 + 0.75 + 0.50 + 0.50, leg III 1.00 + 0.50 + 0.68 + 0.62 + 0.60, leg IV 1.25 + 0.62 + 0.87 + 0.87 + 0.70. Leg spination: Leg I Fm d 1-1-1ap, pr 1ap, Tb pr 0-1, v 2-2-2ap, Mt v 2-2ap; Leg II Fm d 1-1-1ap, pr 1ap, Tb pr 0-1, v 1-1-2ap, Mt v 2-2ap; Leg III Fm d 1-1-1ap, pr and rt 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap, Mt pr 1-2ap, v 1-2ap; Leg IV Fm d 1-1-1, pr and rt 1ap, Tb pr and rt 1-1-1, v 1-1ap, Mt d 2-2ap, pr and rt 1ap, v 2ap. Coloration: Carapace dark brown. Eye field black. Sternum and labium brown. Maxillae light brown. Abdomen grey. Dorsum with five white spots, venter with a pair of white spots in front of spinnerets. Leg I brown, legs II-IV yellow. Palps and legs I-II except for femora covered with white scales. Palpal structure as in Figs 52-54.

FEMALE. Carapace 2.30 long, 1.59 wide and 1.00



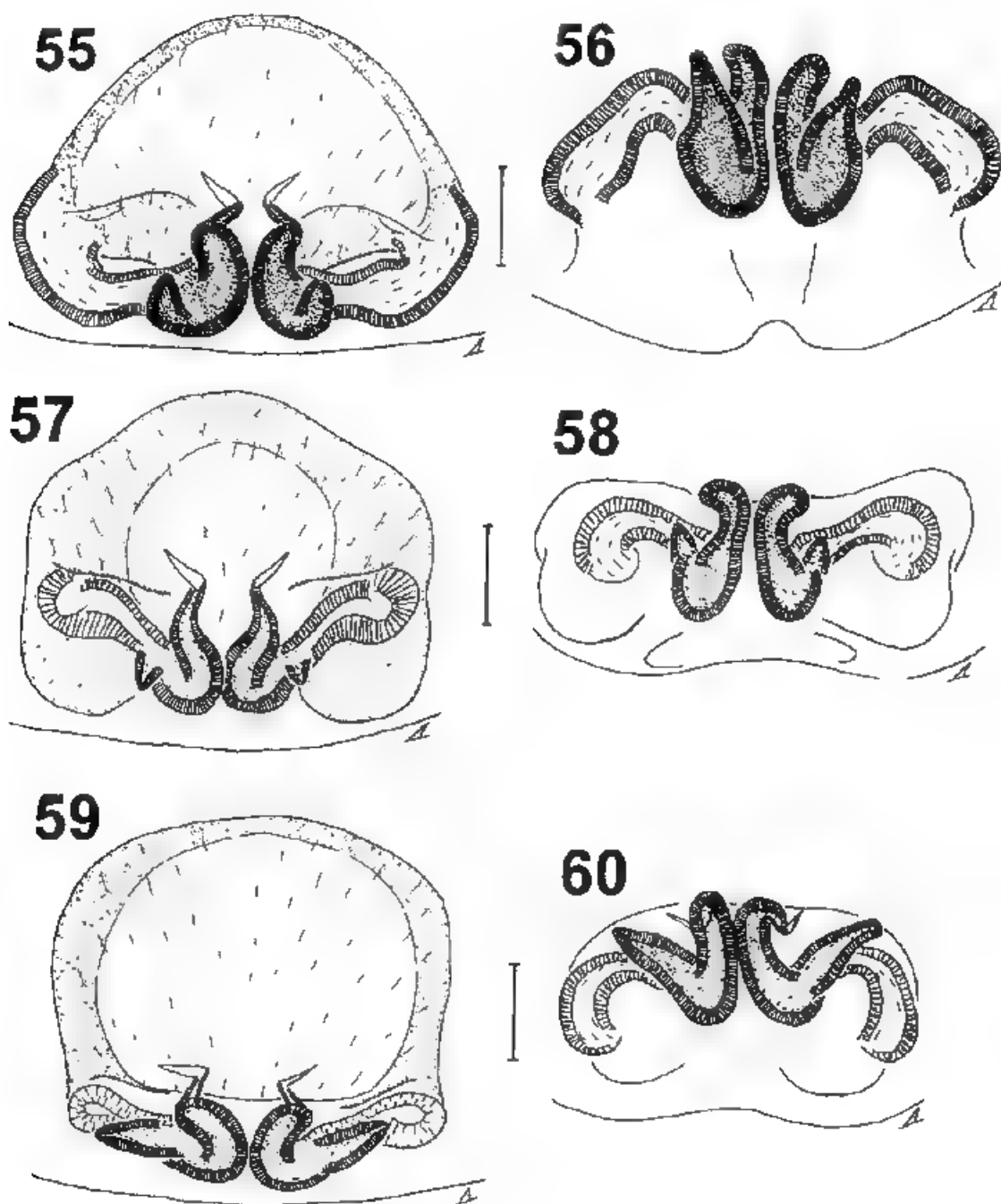
Figs 51-54. *Heliophantus dunni* sp.n. 51 — ♂ palp, ventral view; 52 — ditto, lateral view; 53 — palpal femur, median view; 54 — ditto, lateral view. Scale 0.14 mm.

Рис. 51-54. *Heliophantus dunni* sp.n. 51 — палепа самца, вентрально; 52 — то же, латерально; 53 — бедро палепы, медиально; 54 — то же, латерально. Масштаб 0,14 мм.

high at PLE. Abdomen 2.50 long, 1.49 wide. Chelicera length 0.75. Ocular area 0.87 long, 1.38 wide anteriorly and 1.50 wide posteriorly. Diameter of AME 0.38. Length of leg segments: leg I 1.25 + 0.62 + 0.81 + 0.60 + 0.58, leg II 1.13 + 0.62 + 0.69 + 0.54 + 0.50, leg III 1.20 + 0.50 + 0.62 + 0.63 + 0.62, leg IV 1.36 + 0.62 + 1.00 + 1.06 + 0.68. Leg spination: Leg I Fm d 1-1-1ap., pr 1ap., Tb v 2-2-1ap., Mt v 2-2ap. Leg II Fm d 1-1-1ap., pr 1ap., Tb pr 0-0-1 v 1-1-2ap., Mt v 2-2ap. Leg III Fm d 1-1-1, pr 1ap., Tb pr 1-1, rt 1-1-1 v 1-2ap. Mt d 2-3ap. Leg IV Fm d 1-

1-1 pr 1ap., Tb pr 1-1-1, v 1-2ap., Mt d 2-2-2ap., pr 1-1-1ap. v 1-2ap. Coloration as in ♂, but dorsum gray with a single anterior white spot, and venter with a pair of longitudinal white lines gathering together near spinnerets. Epigyne and spermathecae as in Figs 29, 59-60.

Name. The species is named after the well known Russian arachnologist and our friend Dr. Peter M. Dunin (Russia, Togliatti), who, for many years, has studied the spider fauna of Azerbaijan and eventually collected the bulk of the type series.



Figs 55-60 Spermathecae of *H. equestris* Charitonov, 1963 (55-56), *H. micrometra* Simon, 1868 (57-58) and *H. d. dunipini* (59-60), 55, 57, 59 - dorsal view, 56, 58, 60 - ventral view. Scale 0.1 mm.

Рис. 55-60 Сперматеки *Heliophanus equestris* Charitonov, 1963 (55-56), *H. micrometra* Simon, 1868 (57-58) и *H. d. dunipini* (59-60), 55, 57, 59 - вид сверху, 56, 58, 60 - вид снизу. Масштаб 0,1 мм.

Heliophanus equestris L. Koch, 1867
Figs 35, 62-65

H. e. Kharitonov, 1932: 1, 9; Nemlin, 1985: 130; Prószyński, 1976: map 80; Wesolowska, 1986: 213-214, figs 652-660, 90.

H. simplex Dunin & Mamedov, 1992: 57 (?) non Simon, 1868.

Material: AZERBAIJAN: 1 ♂, 2 ♀ (ISE), Saatly Distr.,

Dz. i. a. k. u. 3. 1. 1978, PD 1 (ZMMU), same loc. 15. 1. 1978, PD 2 (ZMMU), same loc. 11.06.1977, PD 2 (ISE), Baku, Yasnyy skaya dolina, 14.06.1981, PD.

Diagnosis: Easily separable from other *Heliophanus* species by the very long, curved embolus (Fig. 62) as well as by the uncommon genitalia which are similar to those of the members of the so-called *Icius pseudicus* complex (Figs 64-66).

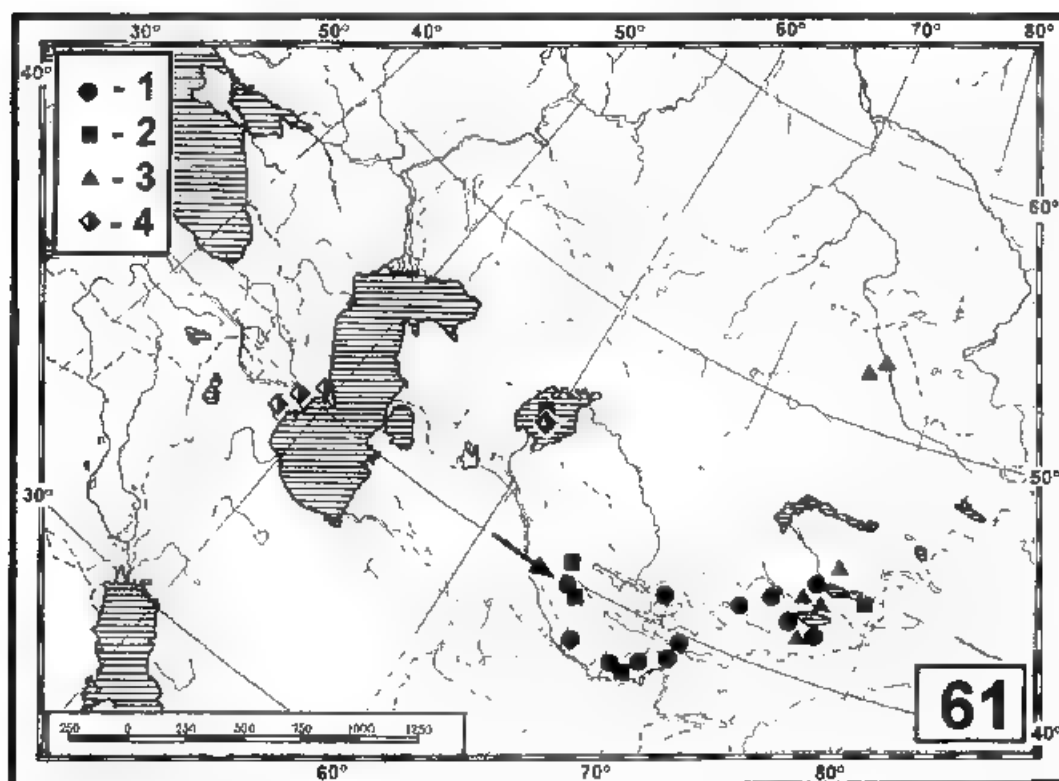


Fig. 61. Localities of *H. potanini* (1), *H. forcipifer* (2), *H. patagius* (3) and *H. dunn* (4) in the Caucasus and in Middle Asia. Locality of the ♂ disjunct of *H. potanini* with a broadened tip of the embolus arrowed.

Рис. 61. Местонахождения *H. потанина* (1), *H. форцифера* (2), *H. патэгиуса* (3) и *H. дунна* (4) на Кавказе и в Средней Азии. Местонахождение уклоняющегося самца *H. потанина* с расширенным концом эмболюса помечено стрелкой.

Distribution. The species has hitherto been known from S Europe only [s. Wesolowska, 1986, fig. 901]. E-Azerbaijan is thus the easternmost locality for *H. equester* (Fig. 35). All localities of *H. equester* in the Caucasus, including the data presented by Kulczynski [1895] and Wesolowska [1986], are shown in Fig. 35.

Description. MALE. Carapace 2.25 long, 1.62 wide and 0.85 high at PLE. Abdomen 2.15 long, 1.55 wide. Cheliceral length 0.54. Ocular area 0.63 long, 1.25 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.45. Length of leg segments: leg I 1.00 + 0.68 + 0.80 + 0.62 + 0.50; leg II 0.87 + 0.59 + 0.62 + 0.58 + 0.42; leg III 1.00 + 0.53 + 0.62 + 0.87 + 0.62; leg IV 1.06 + 0.50 + 0.81 + 1.00 + 0.50. Leg spination: Leg I Fm d 1-1-1ap, Tb pr 0-1 v 2-2ap, Mt v 2-2ap; Leg II Fm d 1-1-1ap, Tb pr 0-1 v 1-1ap, Mt v 2-2ap; Leg III Fm d 1-1-1ap, Tb pr and rt 1-1, v 2ap, Mt d 1-2ap, pr and rt 1ap v 1-2ap; Leg IV Fm d 1-1-1, rt 1ap, Tb pr 1-1 rt 1-1-1, v 1-2ap, Mt d 0-2-2ap, pr and rt 1ap, v 2ap. Coloration: Carapace dark brown. Eye field black. Sternum, maxillae, chelicerae and labium brown. Abdomen grey. Venter with a pair of white spots in front of spinnerets. Leg I dark brown, legs II-IV brown. All legs with proteral, longitudinal yellow lines covered with white scales. Palpal structure as in Figs 62-63.

FEMALE. Carapace 2.25 long, 0.94 wide and 1.00 high at PLE. Abdomen 3.75 long, 2.50 wide. Cheliceral length 0.54. Ocular area 0.80 long, 1.25 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.45. Length of leg segments: leg I 1.00 + 0.62 + 0.75 + 0.62 + 0.50,

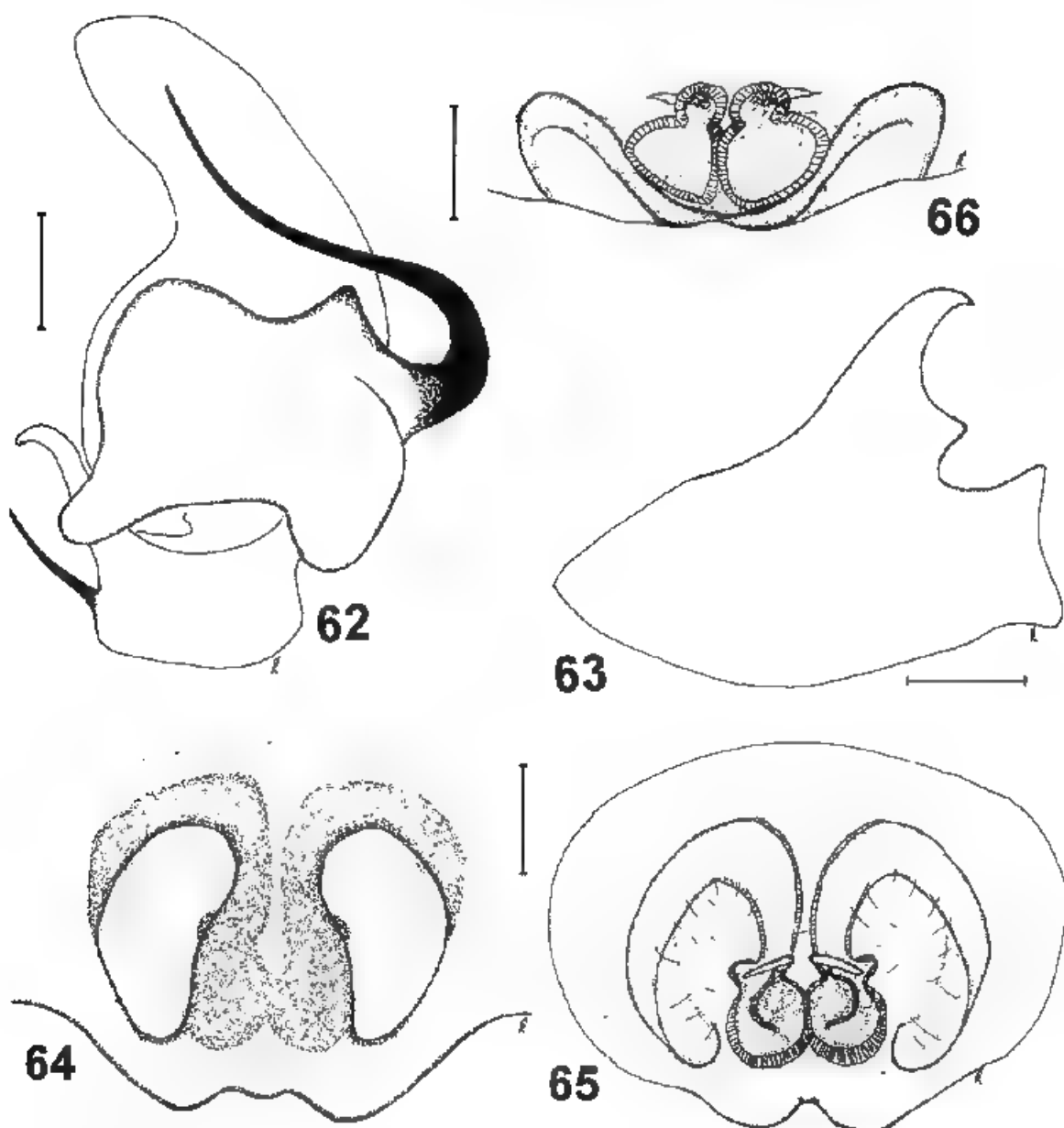
leg II 0.87 + 0.50 + 0.62 + 0.53 + 0.50; leg III 1.00 + 0.62 + 0.75 + 0.87 + 0.62; leg IV 1.20 + 0.62 + 1.00 + 1.15 + 0.50. Leg spination: Leg I Fm d 1-1-1ap, Tb v 2-2ap; Mt v 2-2ap; Leg II Fm d 1-1-1ap, pr 1ap, Tb pr 0-1 v 1-1-1ap; Mt v 2-2ap; Leg III Fm d 1-1-1, pr 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap; Mt d 2-2ap, pr and rt 1ap v 1-2ap; Leg IV Fm d 1-1-1, Tb pr and rt 1-1, v 1-2ap; Mt d 2-2ap, pr and rt 1ap, v 1-2ap. Coloration as in ♂ but carapace brown, with orange sides, maxillae yellow, dorsum grey with a pair of longitudinal parallel white lines in its back part, venter yellow. Epigyne and spermathecae as in Figs 64-66.

Helophanus flavipes Hahn, 1831 Figs 67-75

H. f. Nen n 1984a: 18, 1984b: 136, 1985: 130, Yakhotov: 1955: 362, Fet: 1983: 842, Savchenko: 1990: 173, M. Kharlov & Fet: 1994: 517, Ovtsharenko: 1978: 683, Dunn: 1989: 38, Dunin & Mamedov: 1992: 57, Proszvinsk: 1976: map 75, Kharitonov: 1932: 179.

H. varians Savchenko: 1990: 173.

Material. KABARDINO-BALKARIA: 1 ♂ (ZISP), Cheget Mt., 2200 m alt., 3.07.1976, V.O. — NORTH OSSETIA: 1 ♂ (ZMMU), Buron Canyon, Kasarskoye, L. I. I. I. I., 18.06.1981, S. K. A. Ekseev. KRASNODAR PROVINCE: 3 ♀♀ (ZISP), Caucasian State Reserve, Guzeripli, 650 m alt., 12.07.1974, V.O., 1 ♂ (ZISP), same locality, 18.06.1976, V.O., 1 ♂ (ZISP), Khosta, 17.06.1975, V.O., 2 ♂♂ (ZISP), Maikop, 9.06.1976, V.O. — AZERBAIJAN: 2 ♂♂, 20 ♂♂ (ZISP), (ZMMU), 20-25 km NE of Shemakha, Pirkuji Reserve, 1100-1800 m alt., 23.05-4.06.1984, D.L. 3 ♂♂, 3 ♀♀.

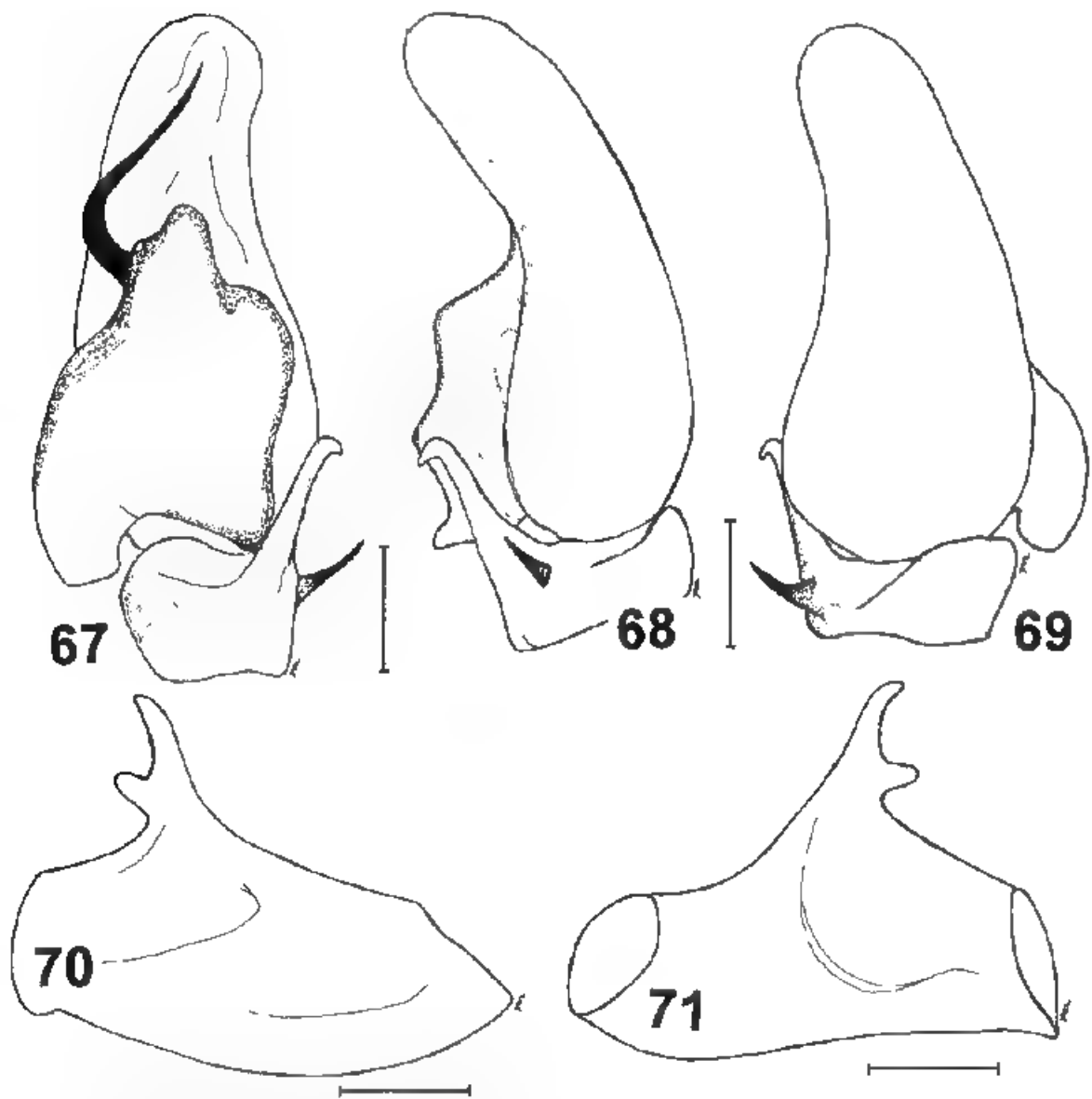


Figs 62-66. *Heliophanus equester* L. Koch 1867 62 — ♂ palpus, ventral view; 63 — palpal femur, lateral view; 64 — epigyne; 65 — spermathecae, dorsal view; 66 — ditto, rear view. Scale 0.14 mm.

Рис. 62-66. *Heliophanus equester* L. Koch 1867 62 — палепа ♂ вентрально, 63 — бедро палепы, латерально, 64 — эпигина, 65 — сперматека, вид дорсально; 66 — то же, вид сзади. Масштаб 0.14 мм.

(ZMMU). Talysh Mts., Lerik 1400-1700 m alt., 10.7-14.09.1985 P.D. 1 (ZMMU), same locality 10.10.1983 S. Gsovatch 1 ♂ (SE), Lerik Distr., Zuvand Divagach, 1300 m alt. 18.07.1983, S. Dashtadurov 2 ♂♂, 3 ♀♀ (SE), Lankoran Distr. Kirovsk. 8.05.1985 P.D. KYRGYZSTAN 1 ♂, 3 ♀♀ (ISE), Issyk-Kul Area, Chon-Urvakty River 1700-2500 m alt., 24.05.1993, D.M., 2 ♂♂, 3 ♀♀ (ISE), same area Teploklyuchinka 19.05.1993, D.M., 1 ♂ (ZISP), Tyup Distr. Santash 10.07.1985 S.O. 1 ♂ (ISE), Lake Issyk-Kul, near Dzhetysay Oguz, 42°18'N, 78°18'E 6.9.07.1994, D.M., 1 ♂ (ISE), 40 km NNW of Bishkek, Kamyshtovka Chu River 7.05.1985 S.O., 2 ♂♂, 3 ♀♀ (ZMMU), same locality, summer 1980, S.Z., 1 ♂ (ZISP) Katurga, 19.07.1977 S.Z. 1 ♂ (SE), Dzhanghi Pakhta, 10.06.1986, S.O. — KAZAKHSTAN 1 ♂ (ZISP), Akmolinsk, Lake Kurshatuzin 06.1929, S. Spassky 2 ♂

(ISE), Pavlovsk Area, 25 km N of Pavlovsk Irtysh River Valley, 8.09.1992, O.L., 1 ♂, 1 ♀ (ISE), same area. Ekibastuz Distr., 5 km SE of Sandert, 10.8.1992, O.L. 2 ♂♂, 1 ♀ (ISE), same area, Bauram-Aul Distr., Kyzyl-Tau, 12.06.1991, O.L., 1 ♂ (SVO), Akmaly Area, Zailiyskiy Alatau Mt. Range, Bolshaya Almatinka River 6.07.1993 S.O., 1 ♂ (ZMMU), S-Kazakhstan Area, Arys, date and collector unknown — TURKMENISTAN 1 ♂ (ZISP), SW-Kopetdagh, Aidere 10.85.1979, V.Y. Fet 1 ♀ (ZMMU) same locality, 26.04.1989, K.G. Mikhailov 1 ♂ (ISE), Fryuza, 24.04.1994, V.D. — UZBEKISTAN: 1 ♂ (ZISP), Tashkent Area, Ordzhonikidze Distr. Svobodnyy, 02.1979 A.B. Nenshin, 1 ♂ (ZMMU), 40 km SW of Tashkent, Gulbator 30.04.1986, S. Kurbatov 1 ♂ (ISE), 7-9 km N of Kitab, Zeravshanskiy Mt. Range, Pass Aman Kutan, 5.05.1995 S.O., 2 ♂♂ (PSL), Termez, summer 1933, M.N.



Figs 67-71 *Heliophanus flavipes* Hahn 1831 67 — ♂ palp, ventral view; 68 — ditto, lateral view; 69 — ditto, dorsal view 70 — female femur, lateral view 71 — ditto, median view Scale: 0.14 mm

Рис 67-71 *Heliophanus flavipes* Hahn 1831 67 — палепа самца, вентрально; 68 — то же, латерально; 69 — то же, вид дорсально; 70 — бедро пальпы латерально 71 — то же, медиально. Масштаб 0,14 мм.

Dan Iova. UNCERTAIN LOCALITIES 1 v (ZISP), Turkistan, Moirani-Kul, 1808 1907, N.D. Zarudny

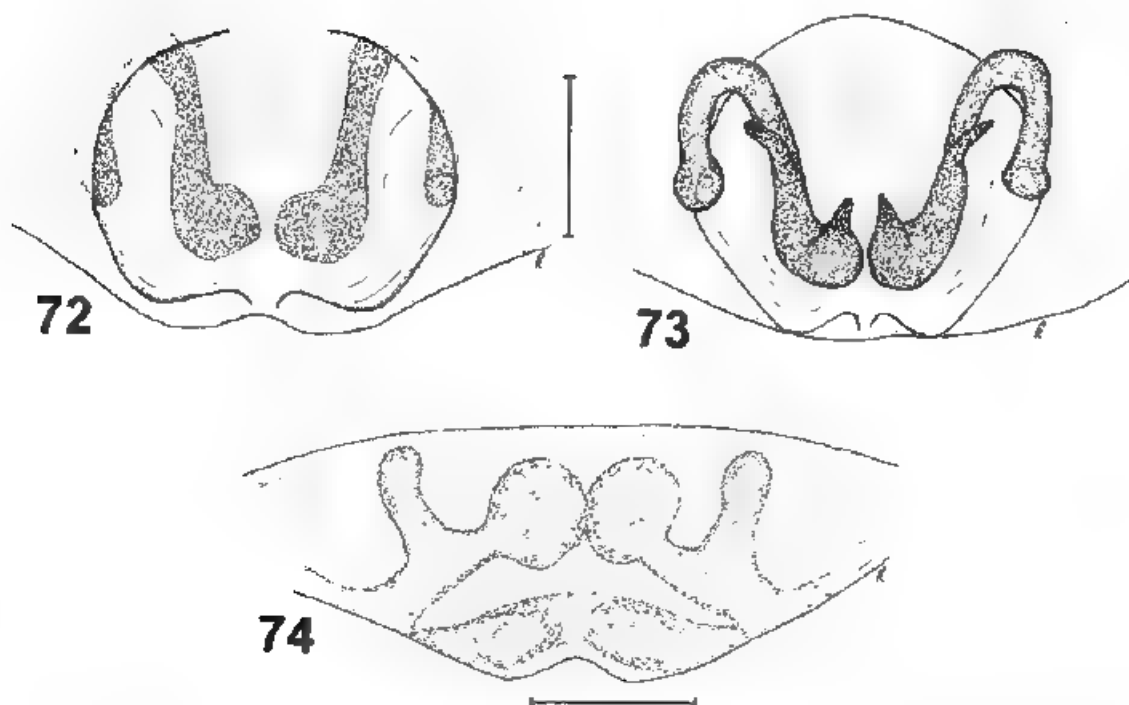
Diagnosis See comments in 'Diagnosis' under *H. auratus* and *H. mordax*

Distribution This Euro-Siberian temperate species has hitherto been reported from Kyrgyzstan Osh [Kroneberg, 1875], Lake Issyk Kul environs of Bishkek (Kuturga and Chu rivers) and Ferganskii Mt Range (Kara-Alma) [Nenilin, 1984b] F Kazakhstan [Savelieva, 1990], Turkmenistan SW-Kopetdagh [Fet, 1983; Nenilin, 1984a, Mikhailov & Fet, 1994], Uzbekistan Tashkent, Samarkand Area (Agalyk Khodzhaduk) and Zeravshanski Mt Range [Kroneberg, 1875; Kharitonov, 1932; Yakhontov, 1955; Alimdzhanov & Bronshtein, 1956; Bronshtein & Murtazaev, 1974; Nenilin, 1984a]

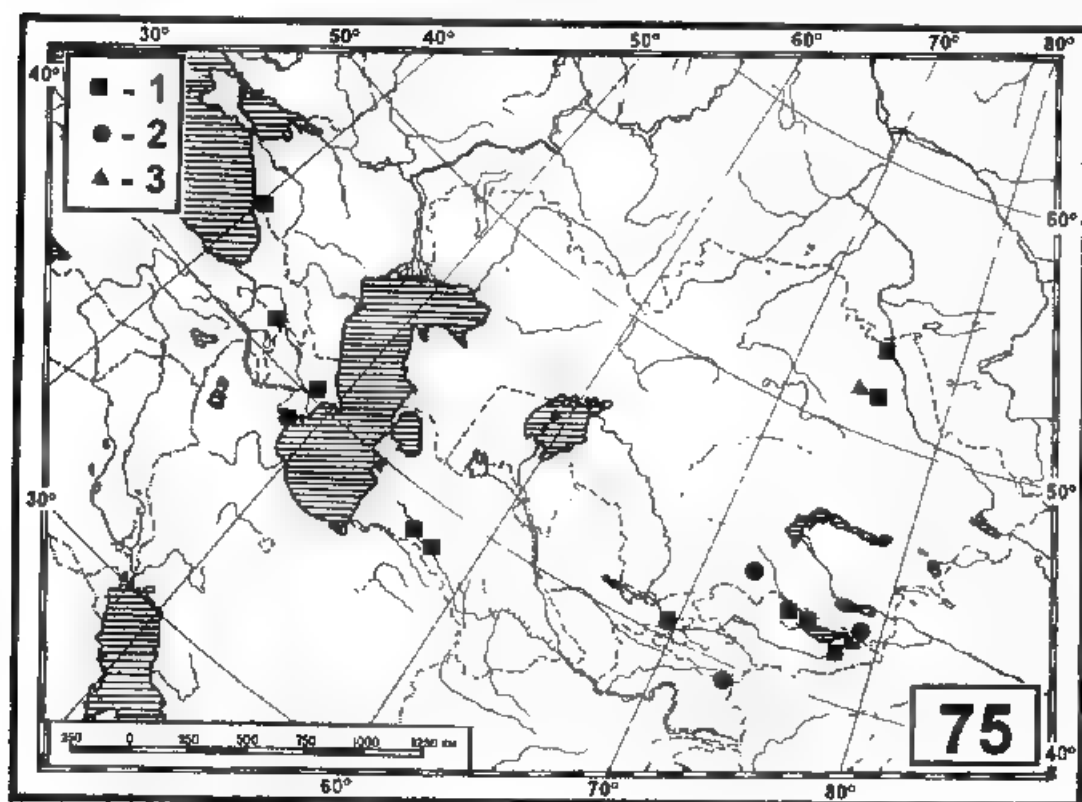
and the Caucasus (Black Sea coast) [Ovtsharenko, 1978] All localities of *H. flavipes* in Middle Asia and the Caucasus are shown in Fig. 75

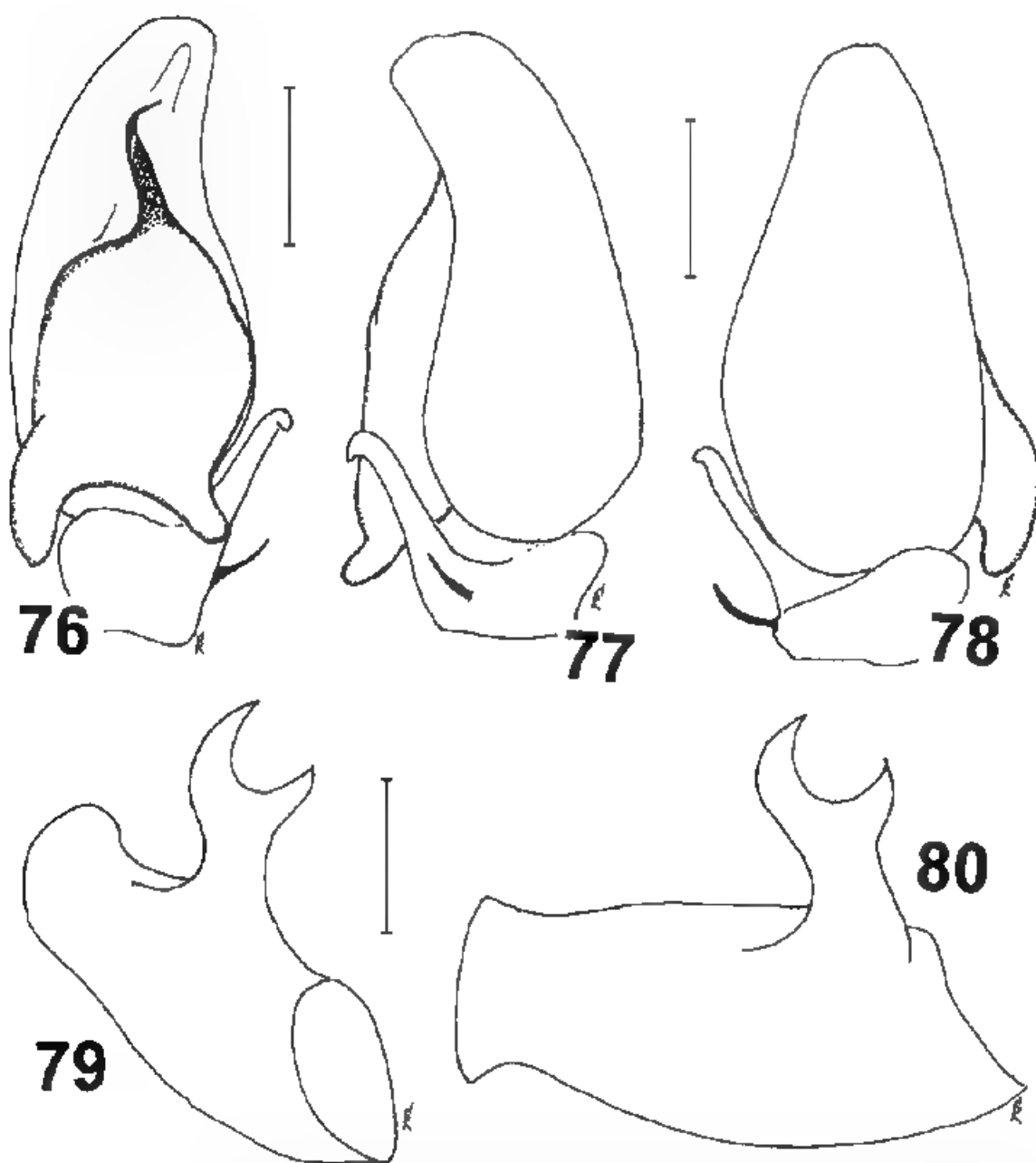
Habitat In the Caucasus, the species has been collected in *Populus* and *Salix* forests along streams, in the litter and under stones

Description MALE Measurements. Carapace 1.60-2.00 long, 1.20-1.50 wide, 0.75-1.14 high at PLE. Ocular area 0.65-0.88 long 0.90-1.14 wide anteriorly and 1.00-1.25 wide posteriorly Diameter of AME 0.30-0.38 Abdomen 1.44-2.25 long 1.14-1.62 wide Cheliceral length 0.62-0.71 Length of leg segments: leg I 0.75-1.00 + 0.25-0.62 + 0.58-0.87 + 0.42-0.58 + 0.40-0.54 leg II 0.62-0.87 + 0.38-0.56 + 0.42-0.60 + 0.50-0.58 + 0.48-0.50 leg III 0.70-0.90 + 0.41-0.50 + 0.48-0.62 + 0.50-0.68 +



Figs. 2-4 *Helophorus fluvialis* Hahn, 1851: 2 — epigynum, 3 — spermathecae, dorsal view, 4 — ditto rear view. Scale: 0.14 mm.
 Рис. 2-4 *Helophorus fluvialis* Hahn, 1851: 2 — эпигиния, 3 — сперматеры, 4 — то же вид сзади. Масштаб: 0.14 мм.





Figs 76-80. *Heliophanus forcipifer* Kulczyński 1895. 76 — ♂ palpus, ventral view. 77 — ditto, lateral view. 78 — ditto, dorsal view. 79 — palpal femur, prolateral view. 80 — ditto, lateral view. Scale: 0.14 mm.

Рис. 76-80. *Heliophanus forcipifer* Кулczyński 1895. 76 — палепа самца, вентрально. 77 — то же, латерально. 78 — то же, вид дорсально. 79 — бедро палепы пролатерально. 80 — то же, латерально. Масштаб: 0.14 мм.

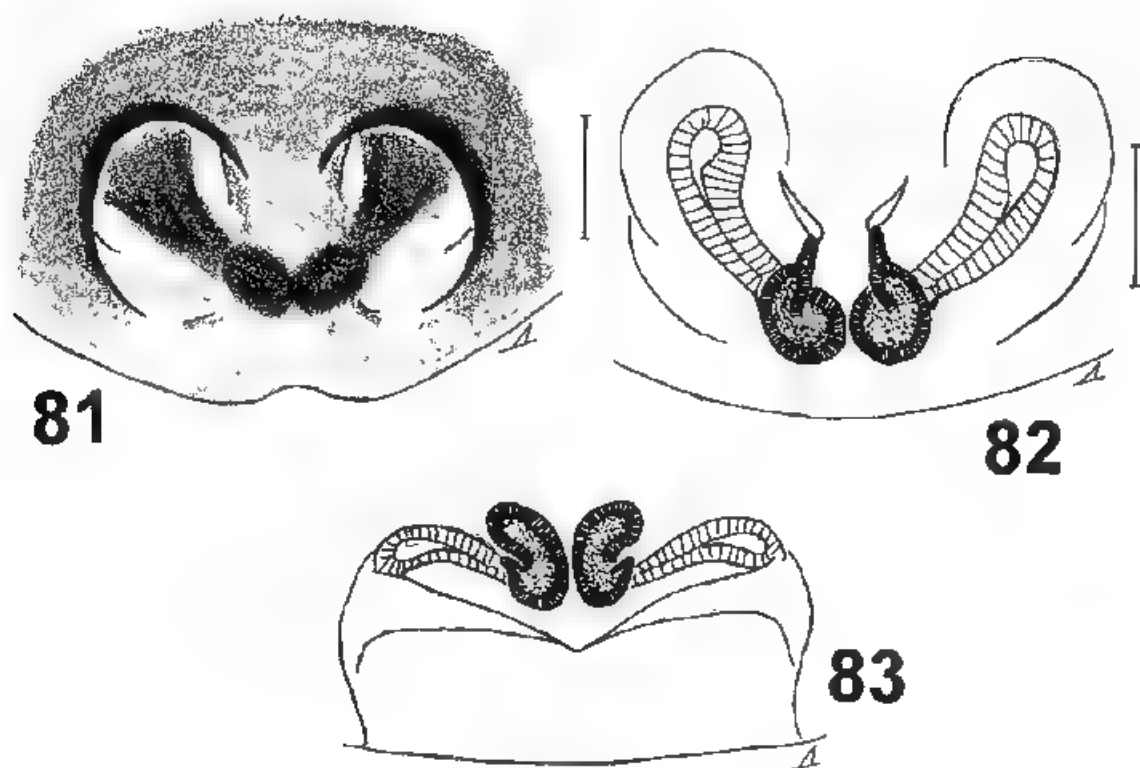
0.38-0.50. leg IV 0.87-1.13 + 0.38-0.50 + 0.62-0.65 + 0.62-0.75 + 0.38-0.62. Leg spination: Leg I 1-1-1-1-1-1. Tb pr 0-1, v 2-2. Mt v 2-2ap. Leg II Fm d 1-1-1, pr 1ap. Tb pr 0-1, v 1-1. Mt v 2-2ap. Leg III Fm d 1-1-1, pr and rt 1ap. Tb pr 1-1, rt 1-1 v 1-2ap. Mt d 2-2ap, pr and rt 1ap, v 1-2ap. Leg IV Fm d 1-1-1, pr and rt 1ap, Tb pr 1-1, rt 1-1 v 1-2ap, Mt d 1-2-2ap, pr and rt 1ap.

v 1-2ap. Coloration typical for *Heliophanus*. Legs yellow with prolateral longitudinal brown lines. Dorsum with an anterior white spot. Palpal structure as in Figs 67-71.

FEMALE. Measurements: Carapace 1.99 long, 1.29 wide, 0.85 high at PLE. Ocular area 0.75 long, 1.06 wide anteriorly and 1.20 wide posteriorly. Diameter of AME 0.38. Abdomen 3.00 long, 1.99 wide. Chel. ceral length

Fig. 15. Localities of *H. flavipes* (1), *H. wesolowskiae* (2) and *H. koktar* (3) in the Caucasus and in Middle Asia.

Рис. 15. Местонахождения *H. flavipes* (1), *H. wesolowskiae* (2) и *H. koktar* (3) на Кавказе и в Средней Азии.



Figs 81-83. *Helophanus forcipifer* Kulczyński, 1895: 81 — epigyne; 82 — spermathecae, dorsal view; 83 — ditto, rear view. Scale: 0.1 mm.

Рис. 81-83. *Helophanus forcipifer* Kulczyński, 1895: 81 — эпигина; 82 — сперматекы; 83 — то же, задний вид. Масштаб: 0,1 мм.

0.75. Length of leg segments: leg I $0.87 + 0.38 + 0.62 + 0.50 + 0.43$; leg II $0.80 + 0.48 + 0.51 + 0.45 + 0.42$; leg III $0.75 + 0.38 + 0.50 + 0.62 + 0.50$; leg IV $1.13 + 0.50 + 0.87 + 0.87 + 0.62$. Leg spination: Leg I Fmd 1-1-1 Tb pr 0-1, v 1-2, Mt v 1-2ap; Leg II Fmd 1-1-1 Tb pr 0-1, v 1-1, Mt v 1-2ap; Leg III Fmd 1-1-1 pr 1ap, Tb pr and pr 1-1, v 1ap; Mt d 2-2ap, pr and rt ap, v 2ap; Leg IV Fmd 1-1-1 Tb pr 1-1, rt 1-1, v 1-2ap; Mt d 1-2ap, pr and rt 1ap, v 1-2ap. Coloration as in ♂, but all legs completely yellow. Abdomen with a white line anteriorly and on sides. Venter with a pair of white spots, a front of spinnerets. Epigyne and spermathecae as in Figs 72-74.

Helophanus forcipifer Kulczyński, 1895
Figs 61, 76-83

H. auratus Pavlenko 1985: 150. Zvezd et al. 1994: 7 (1) non C.L. Koch 183.

H. pr. auratus Pavlenko 1985: 150. Zvezd et al. 1994: 7 (Pavlenko's and Zvezd's specimens re-examined).

Helophanus forcipifer Kharitonov 1992: 14. Material. TAJIKISTAN: 1 ♂ (ZMMU), 2 ♀♀ (ISE), Kurgan-Tyube Area, Dzhamkul Distr. Garmut, 22.01.86. A.Z. KAZAKHSTAN: 1 ♂, 1 ♀ (ZISP), Aral Sea Barsakelmes stano, 25.05.1983. T.V. Pavlenko 1 ♀ (ZSP), same locality, 30.01.81. D.O. Elisev 1 ♂ (SVO), Canyon Charyn, Sartogai, 20.06.1993. SO. UZBEKISTAN: 1 ♂ (SE), Bukhara, 30.08.1976, A.P. Kononenko 3 ♂♂, 2 ♀♀ (ISE), Bukhara Area, 20 km S of Kagan, summer 1995. Coll. 1 ♂ (SVO), same locality 19.05.1994. SO 1 ♂ (ZISP), same locality date and collector unknown; 1 ♀ (ISE), same area. Bukantau Mts, Iran 9.05.1976, A.P. Kononenko 1 ♂ (SVO), 5 Uzbekistan Bajatag Mt. Range, Ak Mechet 28.04.1995. SO 1

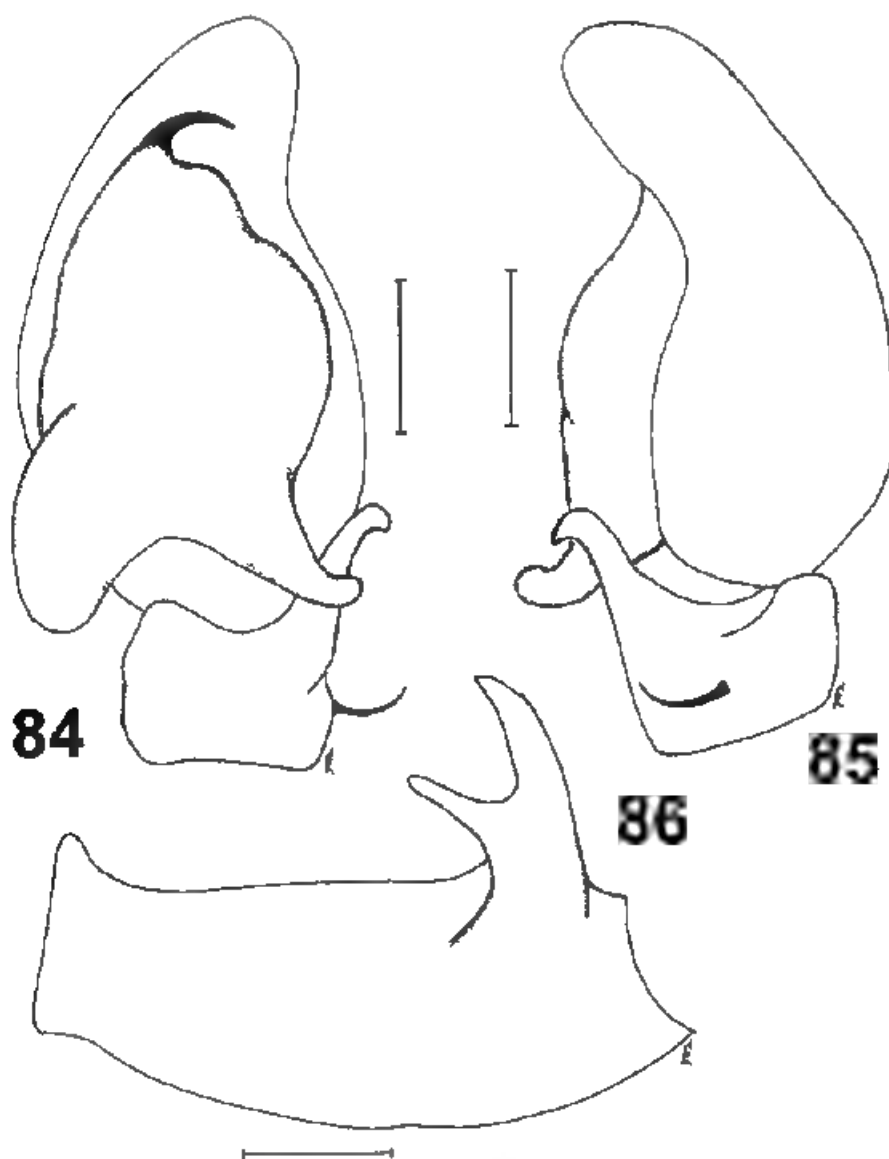
(ISE), S. Uzbekistan Nuratau Mt. Range, 14.05.1976, A.P. Kononenko 1 ♂, 1 ♀ (NCERTAIN LOCALITY 1 (ZISP), 68 km of Nuratau Mt., bank of Syr-Darya River, 12.05.1976. Marchenko.

Diagnosis. The ♂ can easily be separated by the peculiar forceps-shaped femoral process (Figs 79-80). The ♂ of *H. forcipifer* described herein for the first time is similar to that of *H. equester*, but differs clearly in the position of the insemination ducts (cf. Figs 82-83).

Distribution. The Caucasus and Middle Asia (Fig. 61). Up to now *H. forcipifer* has been known from the type locality only (Armenia) [cf. Wesolowska, 1986].

Description. MALE. Carapace 1.50 long, 1.07 wide, 0.94 high at PLF. Abdomen 1.75 long, 1.12 wide. Cheliceral length 0.42. Ocular area 0.50 long, 0.87 wide anteriorly and 1.00 wide posteriorly. Diameter of AME 0.35. Length of leg segments: leg I $0.62 + 0.38 + 0.42 + 0.38 + 0.42$; leg II $0.54 + 0.38 + 0.38 + 0.30 + 0.42$; leg III $0.62 + 0.30 + 0.38 + 0.45 + 0.42$; leg IV $0.88 + 0.40 + 0.54 + 0.53 + 0.42$. Leg spination: Leg I Fmd 1-1-1 pr 1ap, Tb pr 0-1, v 1-1, Mt v 2-2ap; Leg II Fmd 1-1-1 pr 1ap, Tb pr 0-1, v 1-1, Mt v 2-2ap; Leg III Fmd 1-1-1 pr and rt 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap, Mt pr 2ap, rt 1-2ap, v 2ap; Leg IV Fmd 1-1-1, pr and rt 1ap, Tb pr 1-1, rt 1-1-1, v 1-2, Mt d 1-2ap, pr 1-1ap, rt 1-1ap, v 2ap. Coloration: Abdomen dark brown, with a black eye field. Sternum grey. Maxillae and labium brown with yellow tips. Abdomen grey. All leg segments, with the exception of yellow metatarsi and tarsi, dark brown with light lateral longitudinal strips sparsely covered with white hairs and scales. Pa.p. as in Figs 76-80.

FEMALE. Carapace 1.87 long, 1.36 wide and 0.75



Figs 84-86. *Heliophanus kochi* Simon, 1868: 84 — ♂ palp, ventral view; 85 — ditto, lateral view; 86 — palpal femur, lateral view. Scale = 0.14 mm.

Рис. 84-86. *Heliophanus kochi* Simon, 1868: 84 — палепа ♂, вентрально; 85 — то же латерально; 86 — бедро палепы, латерально. Масштаб. 0,14 мм.

high at PLE. Abdomen 2.75 long, 2.00 wide. Cheliceral length 0.74. Ocular area 0.62 long, 1.00 wide anteriorly and 1.15 wide posteriorly. Diameter of AME 0.31. Length of leg segments: leg I 0.87 + 0.42 + 0.50 + 0.42 + 0.47; leg II 0.75 + 0.40 + 0.42 + 0.38 + 0.42; leg III 1.07 + 0.45 + 0.50 + 0.55 + 0.50; leg IV 1.25 + 0.58 + 0.75 + 0.75 + 0.50. Leg spination: Leg I. Fm d 1-1-1 pr 1ap; Tb pr 0-1, v 1-1; Mt v 2-2ap. Leg II. Fm d 1-1-1, pr 1ap; Tb pr 0-1 v 1-1; Mt v 2-2ap. Leg III. Fm d 1-1-1 pr 1ap; Tb pr and rt 1-1 v 1-1ap; Mt d 2-2ap pr and rt 1 ap, v 1-2ap. Leg IV. Fm d 1-1-1 Tb pr 1-1, rt 1-1, v 1-2ap; Mt d 2-2-2ap, pr 1-1-ap; rt 1ap, v 1-2ap. Coloration as in ♂, but paler. Dorsum with a white, irregular colour marking of scales. All legs yellow, but metatarsi and tarsi brownish-yellow. Epigyne and spermathecae as in Figs 81-83.

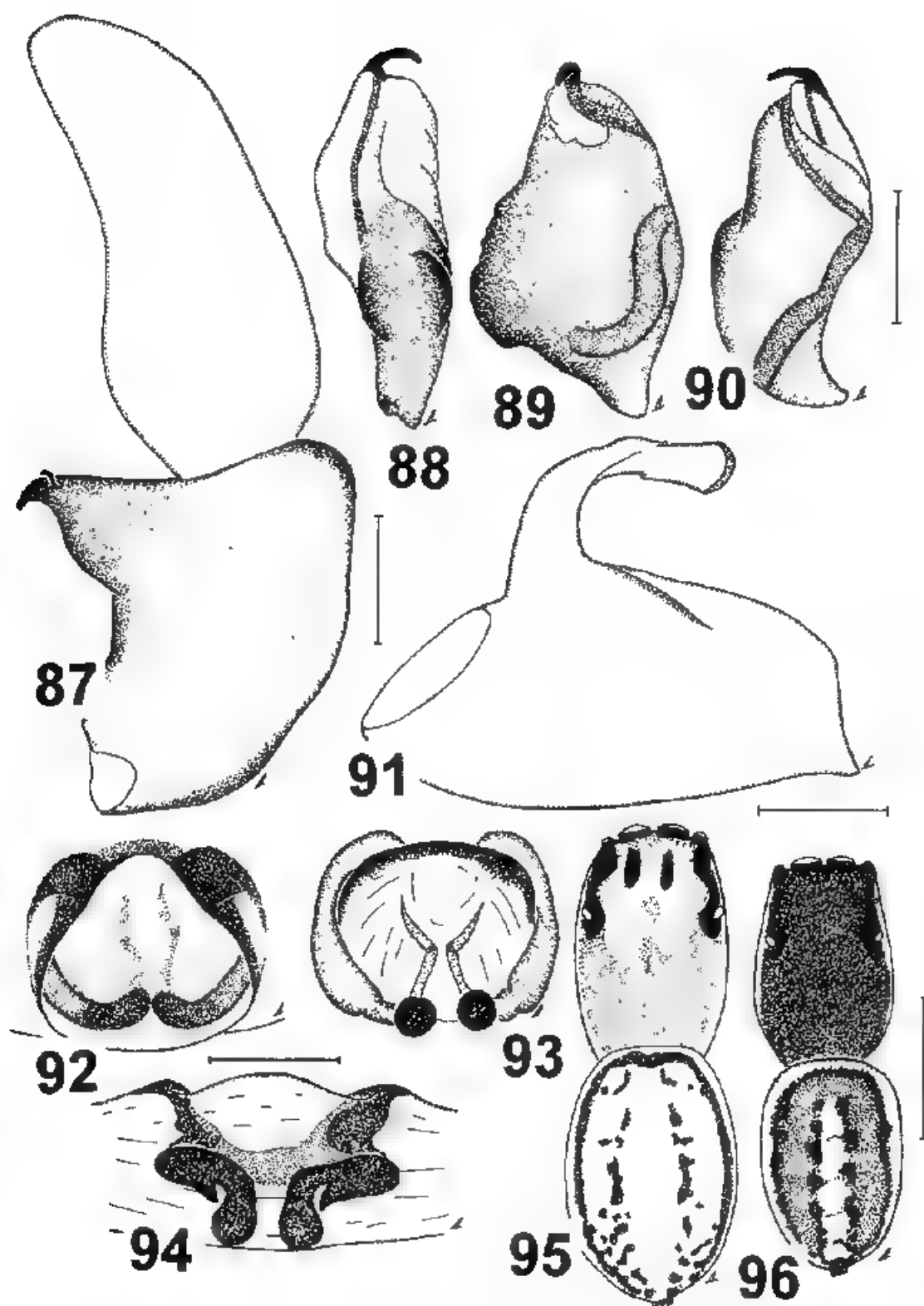
Heliophanus koktas Logunov, 1992 Figs 75, 87-96

H. koktas Logunov, 1992: 52-53 fig.
Material: KAZAKHSTAN, 1 ♂ (ISE), Pavlodar Area, Ekibastuz Distr., 6 km SE of Shiderty, 10.8.1992, O.I.
See also Logunov [1992].

Diagnosis. This species is related to the congeners of the *decoratus* species group (sensu Wesolowska, 1986), but can be easily distinguished by the strong recurved femoral process (Fig. 91) and hook-shaped embolus (Figs 88-90) as well as by the unusual motley body coloration (Figs 95-96).

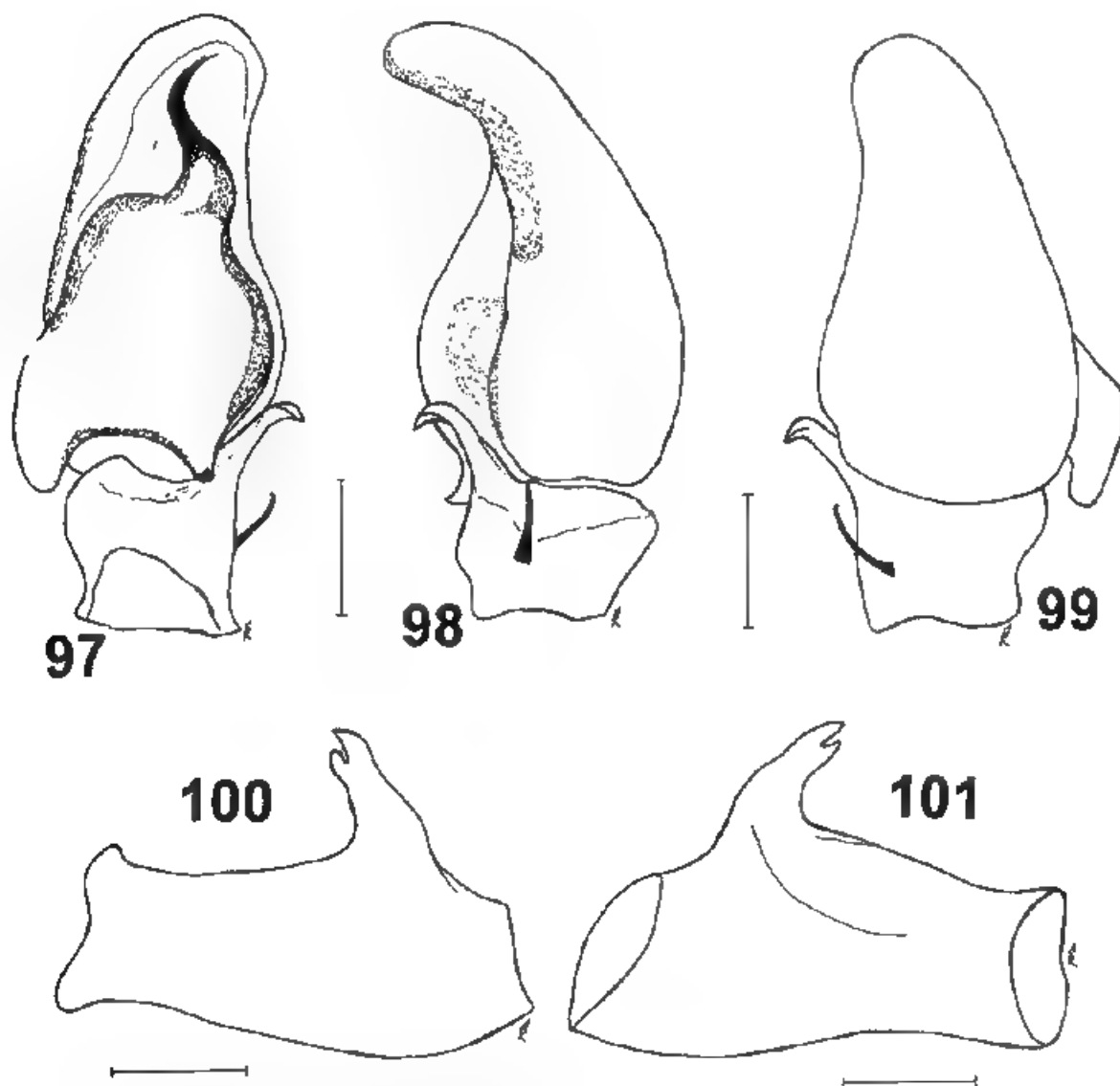
Distribution: N Kazakhstan only [Logunov, 1992, current data].

Description: See Logunov [1992].



Figs 87-96 *Helophanus koktas* Logunov 1992. 87 - palpus dorsolateralis, 88 - bulbus medianus, 89 - ditto, ventral view, 90 - ditto, lateral view, 91 - palpus femoralis lateralis, 92 - epigyne, 93 - spermathecae, dorsal view, 94 - ditto, rear view, 95 - colour pattern of body, 96 - ditto of scales. 0.1 mm (87-94) and 1 mm (95-96).

Рис. 87-96 *Helophanus koktas* Logunov 1992. 87 - паппа дорсолатеральная, 88 - бульбус медиальный, 89 - то же, вентрально, 90 - то же, латерально, 91 - бедро паппы латеральной, 92 - эпитина, 93 - сперматека дорсально, 94 - то же, вид сзади, 95 - рисунок окраски, 96 - то же в ч. масштаб 0.1 мм (87-94) и 1 мм (95-96).



Figs 97-101 *Heliophanus lineiventris* Simon, 1868: 97 — ♂ palp, ventral view; 98 — ditto, lateral view; 99 — ditto, dorsal view. 100 — palpa, femur, lateral view; 101 — ditto, median view. Scale 0.14 mm.

Рис. 97-101 *Heliophanus lineiventris* Simon, 1868: 97 — папыта самца вентрально; 98 — то же латерально; 99 — то же дорсально; 100 — бедро папыты латерально; 101 — то же, медиально. Масштаб: 0,14 мм.

Heliophanus lineiventris Simon, 1868

Figs 21, 28, 57-58, 97-100

H. l. Nent n 1983: 130; Proszynski, 1976: map 74

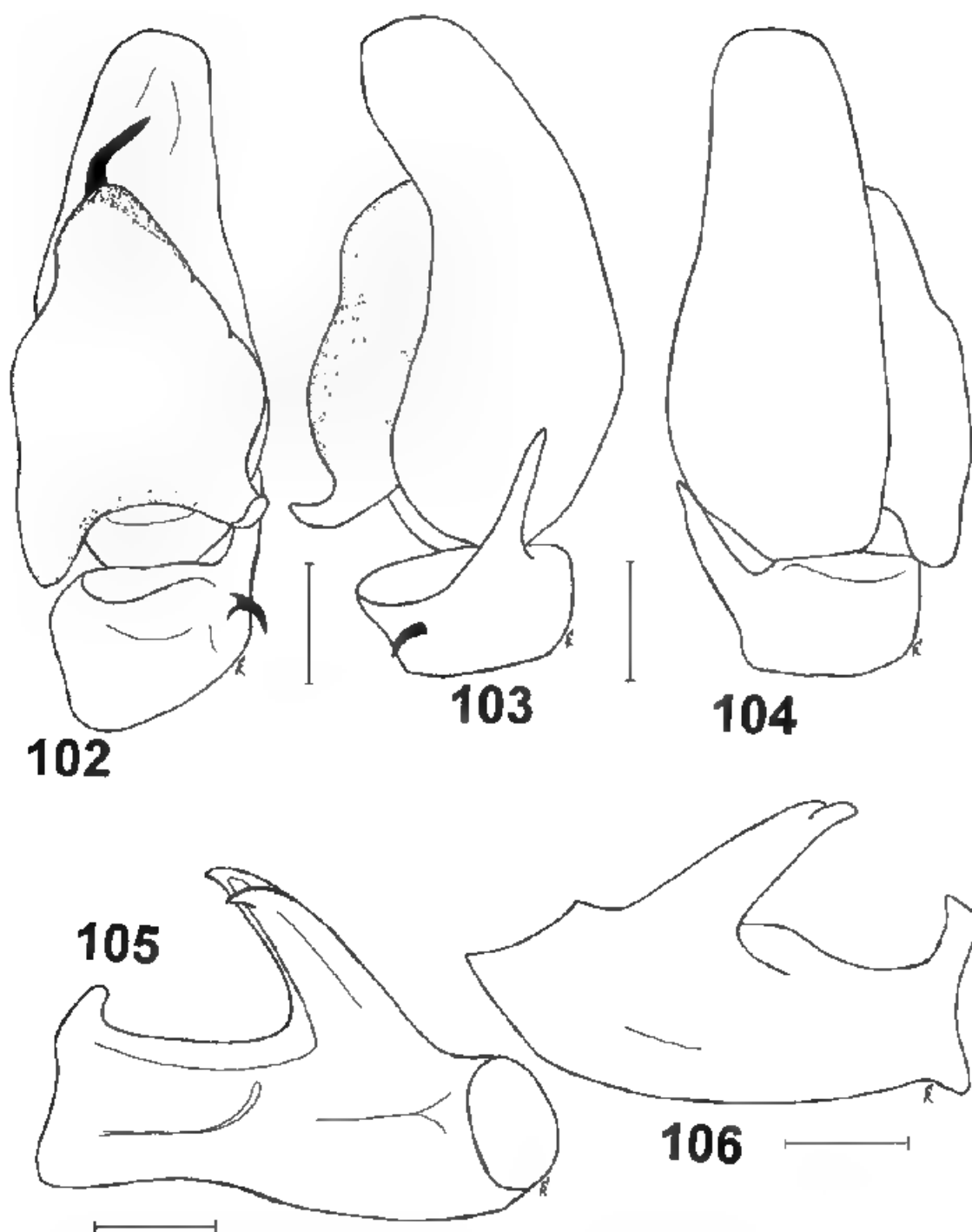
Material. KAZAKHSTAN: 1 ♂ 5 ♀ (ISE), Pavlodar Area Bayanaul Distr. 4-6 km NW of Alkmerghen 24.08.1990. OL, 1 ♂ (ZMMU), same area and district, Kyzyltau, 10-12.06.1991. OL, 1 ♀ (ISE), environs of Pavlodar, Irtysh River Valley, date ? OL, 1 ♀ (ISE), same area Mayskoe Distr., 40 km W of Eluboi, 19.08.1990. OL, 1 ♀ (ISE), same locality, 10.06.1992. OL, 1 ♂ 2 ♀ (ZMMU), Uralsk Area, Dzhanibek, depression 29.05.1974. 1 Goryachev 4 ♂♂, 7 ♀♀ (ZMMU), same locality, 25.08.1982. K.G. Mikhailov

Diagnosis. See comments in "Diagnosis" under *H. chovdensis*

Distribution. This trans-Eurasian temperate species

has hitherto been reported from Middle Asia by Mikhailov & Fet [1994], namely from the SW-Kopetdagh. However, beyond any doubt, their record belonged to *H. turanicus* (Fet's specimens re-examined). In fact all previous records of *H. lineiventris* in Middle Asia have turned out to belong to either *H. chovdensis* or to *H. turanicus* (Fig. 21) while the true *H. lineiventris* seems to be restricted to N-Kazakhstan only.

Description. MALE. Measurements. Carapace 1.70 long, 1.10 wide 0.75 high at PLE. Ocular area 0.65 long, 0.85 wide anteriorly and 1.00 wide posteriorly. Diameter of AME 0.25. Abdomen 2.00 long, 1.25 wide. Cheliceral length 0.45. Length of leg segments: leg I 0.75 + 0.38 + 0.62 + 0.50 + 0.42, leg II 0.70 + 0.40 + 0.47 + 0.38 + 0.38, leg III 0.62 + 0.38 + 0.40 + 0.58 + 0.40, leg IV 0.87 + 0.38



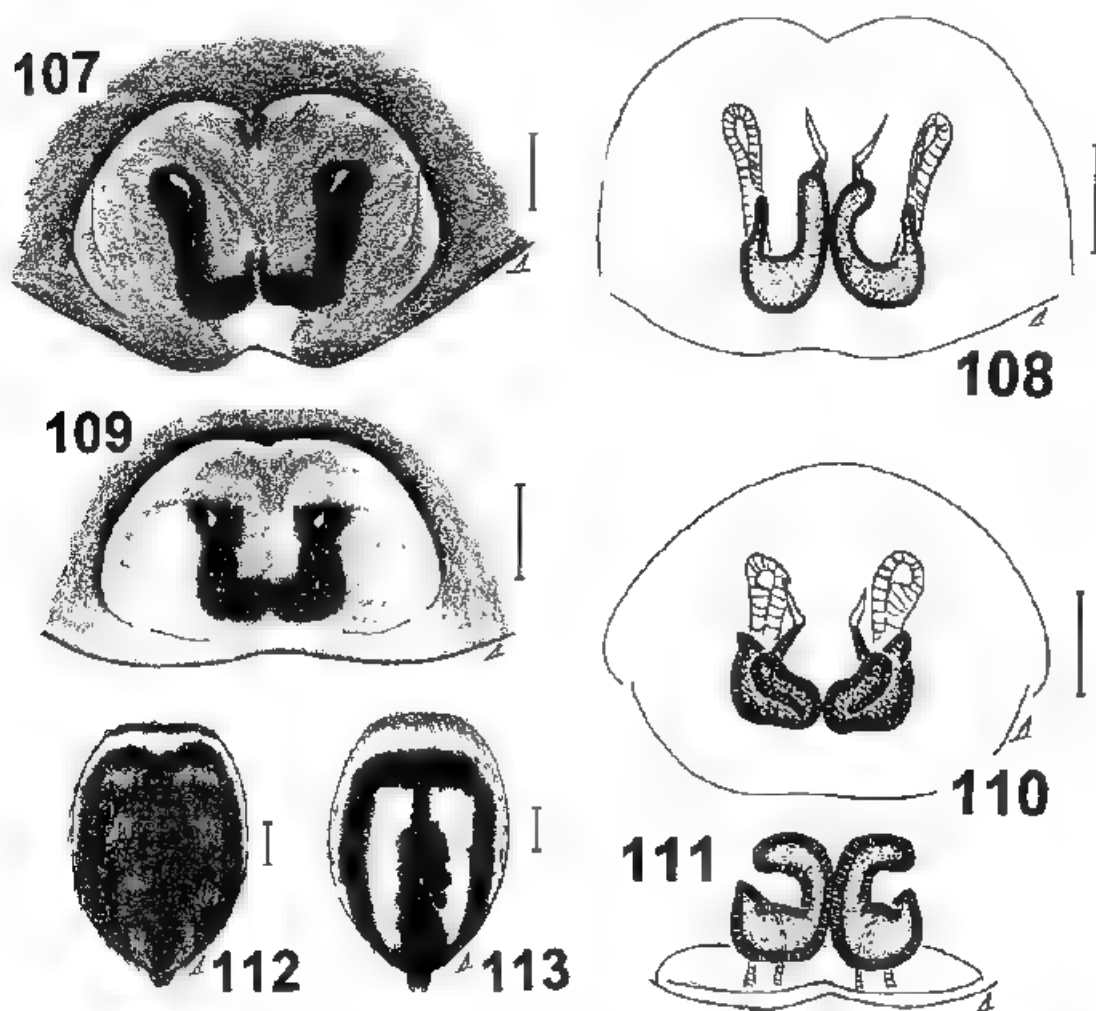
Figs 102-106. *Helophanus mordax* (O.P.-Cambridge, 1872): 102 — ♂ palp, ventral view; 103 — ditto, lateral view; 104 — ditto, dorsal view; 105 — palpal femur, median view; 106 — ditto, lateral view. Scale: 0.14 mm.

Рис. 102-106. *Helophanus mordax* (О.Р.-Кембридж, 1872): 102 — палепа самца, вентрально; 103 — то же, латерально; 104 — то же, дорзально; 105 — бедро пальпы, медиально; 106 — то же, латерально. Масштаб: 0,14 мм.

+ 0.60 + 0.62 + 0.50. Leg spination: Leg I: Fm d 1-1-1, Tb pr 0-1, v 2-2, Mt v 2-2. Leg II: Fm d 1-1-1, Tb pr 0-1, v 1-1, Mt v 2-2ap. Leg III: Fm d 1-1-1, pr and rt 1ap, Tb pr 1-1, rt 1-1-1 v 1-2ap, Mt d 2-2ap., pr and rt 1ap., v 1-2ap. Leg IV: Fm d 1-1-1, pr 1ap., Tb pr 1-1, rt 1-1-1, v 1-2ap., Mt d 2-2ap., pr and rt 1ap., v 1-2ap. Coloration typical

for *Helophanus*. Legs yellow with brownish femora. First leg usually darker. Abdomen grey with anterior tufts of white hairs. Palpal structure as in Figs 97-101.

FEMALE Measurements. Carapace 2.24 long, 1.35 w.de 0.80 high at PLE. Ocular area 0.70 long, 1.00 w.de anteriorly and 1.20 wide posteriorly. Diameter of AME



Figs 107-113. *Helophanus mordax* (O.P.-Cambridge, 1872) (107-108, 112) and *H. verus* Wesolowska, 1986 (109-111, 113): 107, 109 — epigyne; 108, 110 — spermathecae, dorsal view; 111 — ditto, rear view; 112, 113 — dorsal colour pattern. Scales 0.1 (107-111) & 1 mm (112, 113).

Рис. 107-113. Гениталии и окраска брюшка у *Helophanus mordax* (О.П.-Кембридж, 1872) (107-108, 112) и *H. verus* Wesolowska, 1986 (109-111, 113): 107, 109 — эпигина; 108, 110 — сперматеки дорсально; 111 — то же, сзади; 112, 113 — окраска брюшка. Масштаб. 0,1 (107-111) & 1 мм (112-113).

0.35. Abdomen 3.51 long, 2.04 wide. Cheliceral length 0.62. Length of leg segments: leg I 0.82 + 0.47 + 0.62 + 0.42 + 0.38; leg II 0.75 + 0.50 + 0.53 + 0.42 + 0.38; leg III 0.87 + 0.50 + 0.50 + 0.62 + 0.45; leg IV 1.13 + 0.50 + 0.75 + 0.87 + 0.60. Leg spines: Leg I Fmd 1, Tb pr 0-1, v 1-1; Mt v 2-2; Leg II Fmd 1-1-1, Tb pr 0-1, v 1-1; Mt v 2-2ap; Leg III Fmd 1-1-1, rt. lap., Tb pr and rt 1-1, v 1-1ap; Mt d 2-2ap, v 2ap, pr and rt lap; Leg IV Fmd 1-1-1, Tb pr 1-1, rt 1-1-1, v 2ap; Mt d 2-2ap, pr and rt lap, v 1-2ap. Coloration as in ♂ but all legs complete, yellow. Epigyne and spermathecae as in Figs 28-57-58.

Helophanus mordax (O.P.-Cambridge, 1872)
Figs 102-108, 113-114

H. m. Wesolowska, 1986: 10, 41, figs 476-486, map 895.
H. ignoratus Wesolowska, 1986: 10, 214, figs 661-666, map 897 (in part).
H. m. Wesolowska, 1996: 30.

Material AZERBAIJAN: 1 ♂ (ZMMU), Nagornyy Karabakh, Azokh 8.08.1986, P.D., 1 ♂ 1 ♀ (ZMMU), 4 ♂ (ISE), Talysh Mts, Lenik Distr, Zuvand, Gosmah and Dighmach, 1400 m alt, 15.05.1985, P.D. 1 ♂ (ISE), Zavand Divagach, 2.07.1985, P.D. 2 ♂ (ISE), Lenkoran Distr, Gafoni, 3.5.1985, P.D. 1 ♂ (ZMMU), distr. Kurdmash, 12.05.1986, P.D. 1 ♂ (ZMMU), Khanlar, 19.08.1986, P.D. — DAGHESTAN: 2 ♂ ♂, 1 ♀ (ZMMU), Kizilvort Distr, Kakayurt River Valley, 18.05.1991, O.V. Vozgin & O.V. Zabelin — KAZAKHSTAN: 2 ♂ (ISE), Akstafa-Chai River, 28.05.1981, A.Z. — TURKMENISTAN: 1 ♂ (ZISP), SW Koshdag, Khasar Mts, 27.05.1982, S.N. Zabelin, 4 ♂ ♂, 4 ♀ (ZISP), same area, Aidera (06.09.1991, V.V. Fetisov, 1 ♂ (ISE), same locality, 24.04.1991, V.D. & V.K. Zhechenko, 1 ♂ 1 ♀ (ISE), same locality, Kara-Kala, Parkhat, 4.03.1987, A.Z., 1 ♂ (ZISP), same locality, 20.04.1985, S.Z. 1 ♂ (ZMMU), same locality, S slope of Isak Mt, 15.1988, V.V. Muratov, 1 ♂ (ISE), same area, Tersankan, shore of Sumbar River, 11.07.1990, A.N. Galkin, 4 ♂ ♂, 1 ♀ (ISE), C. Kopetdagh, Firuza, 5.04.28.05.1991, V.D., 1 ♂ (ISE), C. Kopetdagh, 20 km E of Nukhur, Canyon Karayachi, 28.04.1991, V.D., 1 ♂ (ISE), 8 km NE of Guzaghly (= Kushka), Morgunovka, 1 ♂ 1 ♀, 23.5.2.

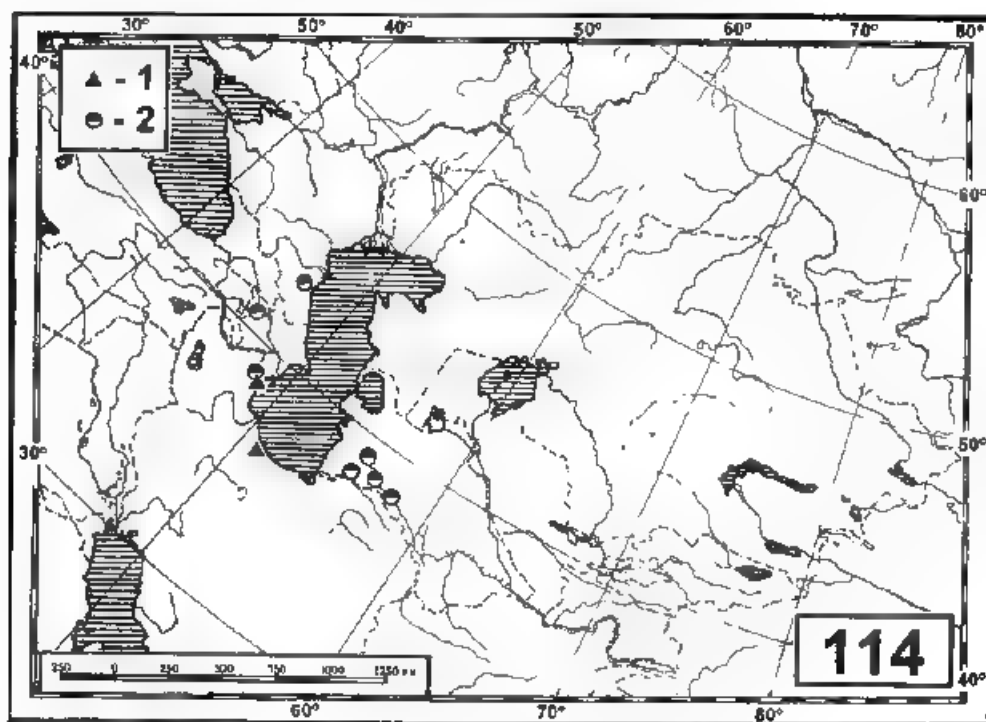


Fig. 114. Localities of *H. verus* (1) and *H. mordax* (2) in the Caucasus and in Middle Asia.

Рис. 114. Местонахождения *H. verus* (1) и *H. mordax* (2) на Кавказе и в Средней Азии.

Diagnosis. Among Middle Asian congeners, the ♂ of *H. mordax* is rather similar to that of *H. flavipes*, but differs in having shorter insemination ducts (cf. Figs 73-74 and 102-108) as well as by the presence of a pair of long radial white lines on the dorsum (Fig. 113). The ♂ of *H. mordax* is closest to that of *H. conspicuus* Wesolowska, 1986, the latter taxon described from Algeria, but it can be separated by the proportions of the tegulum and the narrower femoral process (cf. Wesolowska, 1986, figs 487-491). Both ♂ and ♀ of *H. mordax* are close to those of *H. decoratus* L. Koch, 1875, the latter species known from the Near East and N. Africa [cf. Wesolowska, 1986, figs 563-580], but they can be distinguished by the longer insemination ducts in ♀♀ and the shape of the tegulum in ♂♂. Besides that, ♀♀ are very close to those of *H. verus* (for differences, see comments in "Diagnosis" under *H. verus*).

Distribution. Afghanistan, Turkey, Syria, Lebanon, the Caucasus, and Middle Asia (Fig. 114). In Middle Asia, *H. mordax* has hitherto been reported only from the SW-Kopetdagh (Turkmenistan) [Wesolowska, 1996]. Fet [1983] has referred to this species from same locality as a *Helophanus* sp. (Fet's specimens re-examined).

Description. MALE. Measurements: Carapace 2.13 long, 1.50 wide, 0.90 high at PLE. Ocular area 0.62 long, 1.13 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.38. Abdomen 2.00 long, 1.38 wide. Chelicerall length 0.62. Length of leg segments: leg I 1.00 + 0.50 + 0.75 + 0.70 + 0.55, leg II 1.00 + 0.50 + 0.65 + 0.50 + 0.45, leg III 0.85 + 0.50 + 0.75 + 0.85 + 0.65, leg IV 1.05 + 0.50 + 0.75 + 0.85 + 0.65. Leg spination: Leg I Fm d 1-1-1, pr 1ap, Tb pr 0-1, v 2-1. Mt v 2-2ap. Leg II Fm d 1-1-1, pr 1ap, Tb pr 0-1, v 1-1. Mt v 2-2ap. Leg III Fm d 1-1-1, pr and rt 1ap, Tb pr and rt 1-1, v 1-2ap. Mt

d 1-2ap, pr and rt 1ap, v 1-2ap. Leg IV Fm d 1-1-1, pr and rt 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap. Mt d 1-2-2ap, pr and rt 1ap, v 1-2ap. Coloration: Carapace dark brown, evt. field black. Sternum, maxillae and chelicerae brown. Abdomen black. Legs brown with yellow tarsi and metatarsi. Palpal structure as in Figs 102-106.

FEMALE. Measurements: Carapace 2.30 long, 1.70 wide, 1.00 high at PLE. Ocular area 1.00 long, 1.14 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.35. Abdomen 4.46 long, 3.00 wide. Chelicerall length 0.60. Length of leg segments: leg I 1.00 + 0.55 + 0.75 + 0.70 + 0.55, leg II 1.00 + 0.50 + 0.65 + 0.50 + 0.60, leg III 1.25 + 0.50 + 0.75 + 0.80 + 0.60, leg IV 1.50 + 0.60 + 1.05 + 1.00 + 0.58. Leg spination: Leg I Fm d 1-1-1, Tb pr 0-1, v 2-2. Mt v 2-2. Leg II Fm d 1-1-1, pr 1ap, Tb pr 0-1, v 1-1. Mt v 2-2ap. Leg III Fm d 1-1-1, pr 1ap, Tb pr 1-1, rt 1-1-1, v 1-1ap. Mt d 2-2ap, pr and rt 1ap, v 1-2ap. Leg IV Fm d 1-1-1, pr 1ap, Tb pr 1-1, rt 1-1-1, v 1-2ap, Mt d 1-2-2ap, pr and rt 1ap, v 1-2ap. Coloration as in ♂ but lighter abdomen grey, and legs yellow. Epigyne and spermathecae as in Figs 107-108.

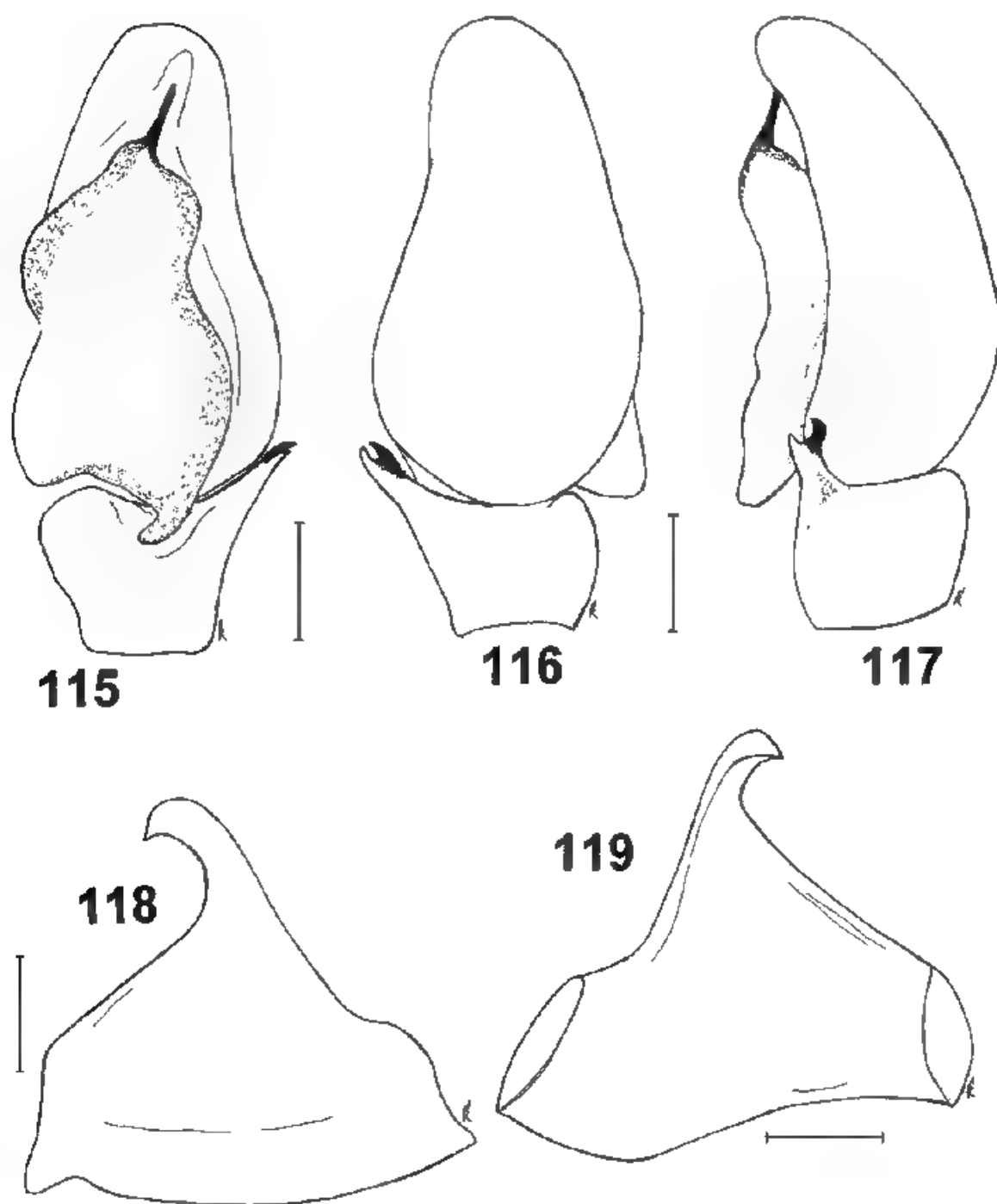
Helophanus patagiatus Thorell, 1875

Figs 61, 115-122

H. p. Spassky & Shnitnikov, 1938: 293. Nenilin, 1984a: 18, 1984b: 136. 1985: 130. Androeva, 1975: 340, 1976: 95, 110. Savcheva, 1990: 173. Mikhailov & Fet, 1994: 517. Zonshteyn, 1984: 148. Dzhun, 1979: 38, 984: 58.

H. p. abolinoatus Nenilin, 1985: 130.

Material. KYRGYZSTAN: 4 ♂ (ZISP), 3 ♀ (ISE), 1 (ZMMU), -20 km S of Bishkek, Kirghizskii Mt. Range, Canyon Malinovoye, 27.0° 1984 S.O., 1 ♀ (ZMMU), same range, Canyon Issyk-Ata, 17.00 malr, 24.06 1984 S.O., 4 ♀ (ISE). Lake Issyk-Kul,

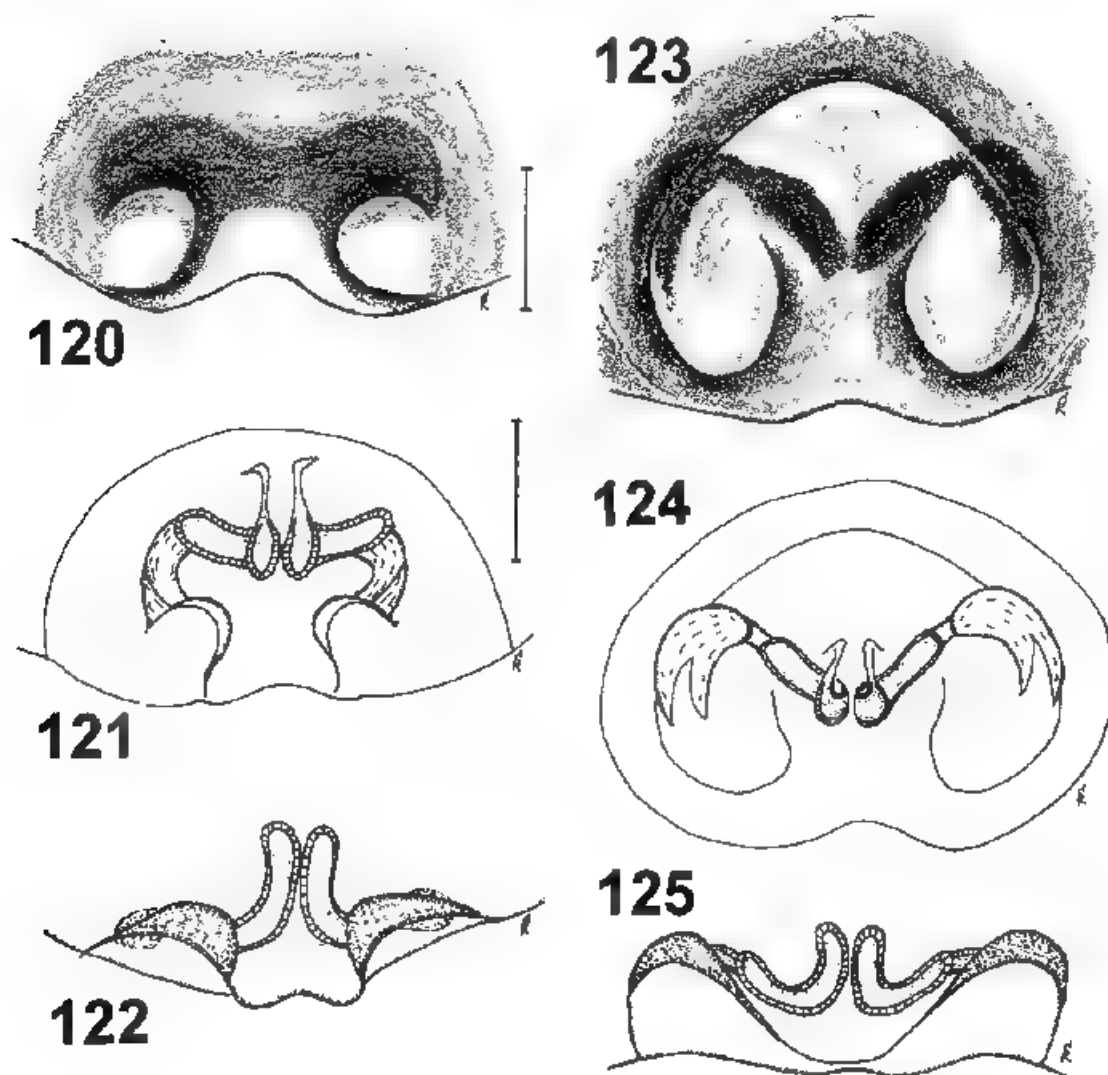


Figs 115-119 *Heliophanus patagatus* Thorell, 1875: 115 — ♂ palp, ventral view; 116 — ditto, dorsal view; 117 — ditto, lateral view; 118 — palpa. femur, lateral view; 119 — ditto, median view. Scale 0.14 mm.

Рис 115-119 *Heliophanus patagatus* Thorell, 1875: 115 — палепа самца, вентрально; 116 — то же, дорсально; 117 — то же, латерально; 118 — бедро палепы, латерально; 119 — то же, медиально. Масштаб 0.14 мм.

Тер.оклыушенка 19.06.1995 S.O., 1 ♂ (ISE), same locality. Canyon-Uryukty, 16.06.1991, S.O., 2 ♂ (ZISP), N slopes of Kyzylzskii Mt Range, Uzun-Bulak, 06.1995, S.O., 1 ♂ (ISE), Dzangl. Pakhra. 11.06.1986 S.O., 1 ♂ (ZMMU), Canyon Kirturga, 14.07.1977, S.O., 1 ♂ (ISE), E part of Susamyrtoo Mt Range, Kobuksu River, 27.07.1993, S.O., 1 ♂ (ISE), Talasskii Mt Range, Canyon Boomskoye Kapkan, 3.07.1985, S.O., 1 ♂ (ZISP), Talas Valley, Shaker,

24.27.07.1979 S.Z., 2 ♂ (ZISP), same valley, Kok Sar, 2.08.1979, S.Z., 1 ♂, 1 ♀ (ZMMU), Lake Issyk-Kul, Do. nka, 26.06.1980 S.Z., 1 ♂ (ISE), Tersker-Atatoo Mt. Range, Arasan River. 19.06.1991, S.O. — KAZAKHSTAN: 1 ♂ (ZMMU), environs of Pavlodar, Irtysh River Valley, 28.06.1994, O.L., 3 ♂ ♂ 6 ♀ ♀ (ISE), 25 km N of Pavlodar, Irtysh River Valley, 8.06.1992, O.L., 1 ♂ 2 ♀ (ISE), 20 km S of Pavlodar, Zarva, 17.06.1992, O.L., 1 ♂ (ISE),



Figs 120-125. Genitalia of *Heterobius patagiatus* Thorell, 1875 (120-122) and *H. petraei* Schenkel, 1963 (123-125): 120, 121 — epigynum; 122 — spermatheca; 123, 124 — epigynum; 125 — spermatheca. Scale 0.14 mm.

Рис. 120-125. Гениталии *Heterobius patagiatus* Thorell, 1875 (120-122) и *H. petraei* Schenkel, 1963 (123-125): 120, 121 — эпигиний, 122 — сперматека; 123, 124 — эпигиний, 125 — то же, сзади. Масштаб 0.14 мм.

Pavlovsk Area, Ekibastuz Distr., 6 km SE of Shuderty. Shuderty River Valley, 1.08.1992, O.L., 1 ♂ (ISE). Tarbagatay Mt. Range, 45 km S of Ogulsk, 22.07.1993, S.O., 1 ♂ (ISE). Zhambyl (= Dzhambul) Area, Vysokoe, 9.05.1984, coll. ?, 1 ♂ (ISE). Kazakhstan Area, Arys, 28.04.1993, D.L., 2 ♂ (ISE). Talay-Kurgan Area, 15 km NE of Tekeli, Kora River, 13.06.1993, V.K. Zinchenko, 1 ♂ (SVO). canyon of Charyn River, 15 km N of Chumak, 12.06.1993, S.O., 1 ♂ (ZISP). environs of Almaty, Kumbel, 1800-2500 m alt, 26.06.1983, C.K. Tarabaev, 1 ♂ (ZISP). Almaty Area, Ketmen Mt. Range, Bozhok Aksa Canyon, Lake Ketmen, 8.07.1989, S.O., 1 ♂, 1 ♀ (ZMMU). Dzhalsk Area, Dzhanibek, 30.06.1982, K.G. Mikhailov — UNCERTAIN LOCALITY, 1 ♂ (ISE). Bymbarovo (?), 17.08-6.09.1991, coll. ?

Diagnosis. *H. patagiatus* can easily be separated from other Central Asian congeners by the strongly chitinized epigyne with an elevated central part (Fig. 120) and by the unramous, claw shaped tibial apophysis (Figs 115-117).

Distribution. This trans-Palearctic polyzonal species has hitherto been reported from Middle Asia, namely

from Kyrgyzstan: Lake Issyk-Kul, Canyon Kuturga environs of Bishkek (Dolinka), Uzun-Burak, Talasskii, Ferganskii, and Chirchikskii mt. ranges [Nenilin, 1984b; Zonshteyn, 1984]. E and S-Kazakhstan [Spassky & Shnitnikov, 1937; Savchenko, 1990], Turkmenistan (with out exact locality) [Mikhailov & Fet, 1994], and Tajikistan: Khozratsho and Hissar mt. ranges, Canyon Varzob, Takob, and Pass Fakhrabad [Andreeva, 1975, 1976].

Notes. *H. patagiatus* has repeatedly been reported from the Caucasus [Dunin, 1979, 1984]. However, we have found relevant specimens belonging to this species neither in Dunin's collections nor in any other salticid material deriving from the Caucasus. Hence the occurrence of *H. patagiatus* in the entire Caucasus requires confirmation upon pertinent material.

Description. MALE. Measurements. Carapace 1.80 long, 1.15 wide, 0.75 high at PLE. Ocular area 0.70 long, 0.95 wide anteriorly and 1.00 wide posteriorly. Diameter of AME 0.35. Abdomen 1.80 long, 1.25 wide. Chelicera

length 0.62. Length of leg segments: leg I 0.87 + 0.50 + 0.62 + 0.50 + 0.40; leg II 0.70 + 0.42 + 0.16 + 0.38 + 0.40; leg III 0.75 + 0.38 + 0.50 + 0.58 + 0.47; leg IV 1.00 + 0.50 + 0.75 + 0.85 + 0.42. Leg spination: Leg I Fm d 1-1-1, Tb pr 0-1, v 2-1, Mt v 2-2ap. Leg II Fm d 1-1-1, pr 1ap, Tb pr 0-1 v 1-1, Mt v 2-2ap. Leg III Fm d 1-1-1 pr 1ap, Tb pr and rt 1-1, v 1-2ap, Mt d 2-2ap, pr and rt 1ap, v 2ap. Leg IV Fm d 1-1-1; Tb pr 1-1, rt 1-1-1 v 1-2ap, Mt d 2-2ap, pr and rt 1ap, v 3-2ap. Coloration typical for *Heliothrips*. Dorsally, all femora yellow with a brown longitudinal line, ventrally dark brown. All tarsi and metatarsi yellow. Palpal structure as in Figs 115-119.

♀ FEMALE Measurements. Carapace 2.25 long, 1.50 wide, 1.25 high at PLE. Ocular area 0.65 long, 1.20 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.35. Abdomen 3.00 long, 2.00 wide. Cheliceral length 0.75. Length of leg segments: leg I 0.95 + 0.65 + 0.70 + 0.50 + 0.55; leg II 0.85 + 0.60 + 0.68 + 0.50 + 0.55; leg III 0.90 + 0.50 + 0.65 + 0.75 + 0.70; leg IV 1.25 + 0.65 + 1.00 + 1.05 + 0.70. Leg spination: Leg I Fm d 1-1-1, Tb pr 0-1, v 2-2; Mt v 2-2. Leg II Fm d 1-1-1 pr 1ap, Tb pr 0-1, v 1-1, Mt v 2-2ap. Leg III Fm d 1-1-1, pr 1ap, Tb pr and rt 1-1, v 1ap, Mt d 1-2ap, pr and rt 1ap, v 2ap. Leg IV Fm d 1-1-1, Tb pr and rt 1-1, v 1-2ap, Mt d 2-2ap, pr and rt 1ap, v 1-2ap. Coloration as in ♂, but lighter. Epigyne and spermathecae as in Figs 120-122.

Heliothrips potanini Schenkel, 1963

Figs 61, 123-131

H. p. Nenilin 1984b: 136, 1985: 130. Logunov 1992: 66. Zyuzin & Tarabaev, 1994: 400.

H. cambridgei: Spassky & Shnitnikov, 1937: 294.

H. tributosus: Prószyński, 1979: 309-310, figs 117-118. non Simon 1868.

Material. TAJIKISTAN: 2 ♂♂, 2 ♀♀ (ZISP), 1 ♂ (ISE). Komsomolabad Distr., Sanglok Mt. Range, Lyulya Kharva, 1800 m alt., 20.07.1978, S.O., 1 ♂ (ZMMU), S part of Nurekskoye Reservoir, crest of Sanglok Mt. Range, 2100 m alt., 7.05.1993, S.Z., 1 ♂ (ZMMU), 4 ♂♂ (ISE), same range. Seistan, 3-7.05.1991, S.O., 1 ♀ (ISE), Yazgulem, 18.07.1988, S.O. — KYRGYZSTAN: 1 ♂, 4 ♀♀ (ISE), 20 km S of Bishkek, Kirghizskan Mt. Range, Canyon Malinovoye, 27-28.07.1984, S.O., 2 ♂♂ (ISE), same locality, 19.04.1992, S.Z., 2 ♂♂ (ISE), same locality, Canyon Kara-Balta, 16 km S of Sosnovka, 25.05.1995, S.O., 1 ♂ (ISE), same locality, Ala-Archa, 10.7.1991, S.O., 1 ♂ (ZISP), environs of Bishkek, Chu Valley, summer 1980, S.Z., 1 ♀ (ISE), same locality, Kok-Dzhar, 28.05.1985, S.O., 4 ♀♀ (ISE), Chon-Aryk, 43°19'N, 78°58'E, 4.07.1994, D.M., 1 ♂ (ZISP), Baubashata Mt. Range, Zindan Mt., 11.08.1981, S.Z., 1 ♀ (ISE), Dzhalalabad Area, Dzhan-Dzhan Distr., Tolb-Kunar, 14.06.1992, A.Z. & A. Fedorov, 2 ♀♀ (ZISP), same locality, 5 km SW of Kyzyl-Dzhar, 22.06.1992, A.Z. & A. Fedorov, 1 ♂ (ISE), same area, Baubashata Mt. Range, Arslanbob, 14.05.1993, S.O., 1 ♂ (ZISP), Kichik Ala Mt. Range, Kirghiz-Ata River, S of Iski-Naukat, Karagai, 2500-3000 m alt., 1.06.1985, S.Z., 1 ♂ (ZMMU), Inner Tian-Shan Mts., E part of Susamyr-Too Mt. Range, middle reaches of Kokomeran River, 21.06.1991, S.Z., 2 ♀♀ (ISE), Kungur-Alatoo Mt. Range, Canyon Boomskeye, 28.06.1991, S.O., 1 ♀ (ZISP), same canyon, Kyzyl-Kus, 26.05.1992, S.O., 1 ♂ (ISE), same locality, 28.06.1991, S.O., 2 ♀♀ (ISE), same canyon, Kapkan, 3.07.1985, S.O., 1 ♂, 1 ♀ (ZMMU), Sary-Chelek Reserve, 2 km S of Arkit, 20.06.1992, A.Z. & A. Fedorov, 1 ♂, 2 ♀♀ (ZMMU), 1 ♀ (ISE), Talas Area, Toktogul Distr., Pass Kek-Bel, 1500 m alt., 27.06.1992, A.Z. & A. Fedorov, 1 ♂ (ZISP), Talasskii Mt. Range, Itagar, 2.06.1987, S.Z., 2 ♂♂ (ISE), Toktogulskoye Reservoir, Uzun-Akhmat, 4.06.1995, S.O., 1 ♂, 2 ♀♀ (ISE), 20 km N of Toktogulskoye Reservoir, Chichkan River Valley (left tributary of Naryn River), 1600 m alt., 29.05-

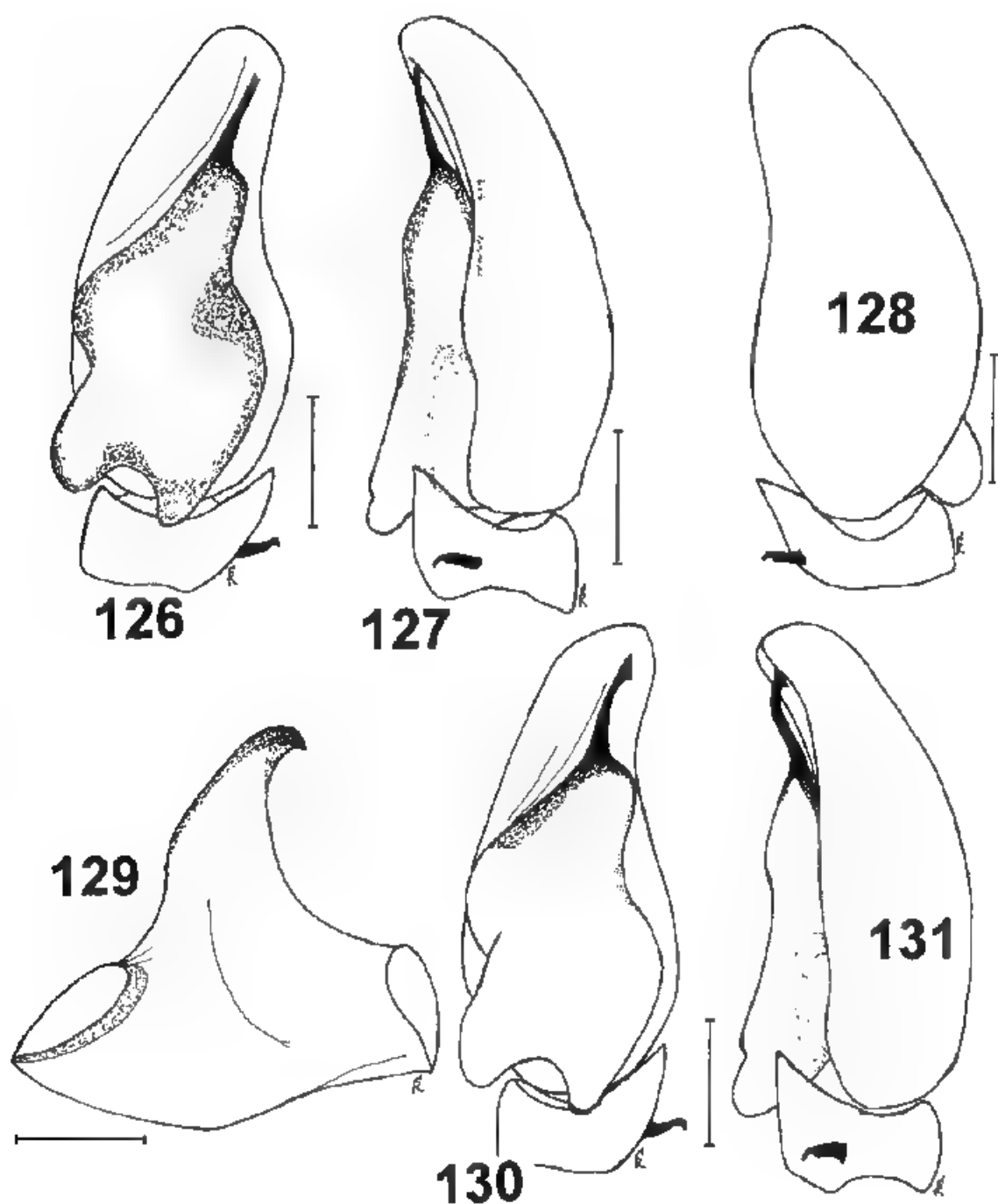
1.06.1995, S.O. & D.M., 1 ♀ (ISE), Lake Issyk-Kul, 21.05.1980, S.Z., 1 ♀ (ISE), Kokeran Mt. Range, 41°2'N, 73°55'E, 11.08.1995, D.M., 2 ♂♂ (ISE), W-Kyrgyzstan, Kara-Archa, 42°47'N, 71°78'E, 1400 m alt., 4.05.1994, D.M., 1 ♀ (ISE), 13 km N of Tash-Kumyr Kara-Tyr, 41°28'N, 72°14'E, 18.23.05.1995, D.M., 1 ♀ (ISE), Terskei-Alatoo Mt. Range, Canyon Tosar, 1700 m alt., 10.08.1987, S.O., 1 ♀ (ISE), same locality, Arasan, 19.06.1991, S.O. — UZBEKISTAN: 1 ♀ (ISE), Surkhadaryn'skaya Area, 60 km NNW of Kokand, Khatan, Pass Kamchik, 41°02'N, 70°23'E, 16.05.1994, D.M., 1 ♂ (ISE), same area, Baisun Distr., Baksun-Tau Mt. Range, Khatat, Canyon Baglydara, 1500-1800 m alt., 28.04.1986, col. ♀, 1 ♀ (ISE), same range, Baksun, 18.05.1976, A.P. Kononenko, 1 ♂ (ISE), Kuntangtau Mt. Range, Kamnar-Tupa, 19.05.1983, A.B. Nenilin, 1 ♂ (ZMMU), same range, Ak-Tau, 22.05.1984, A.V. Tanasevich, 1 ♂, 2 ♀♀ (ISE), Bukhara Area, 20 km S of Kagan, Farm Dzheranai, 19.05.1994, S.O., 2 ♀♀ (ZISP), Tashkent Area, Chirchik River, Tuzel, 31.08.1979, A.B. Nenilin, 1 ♀ (ZISP), same area, Bostanlyk Distr., Aksak-Ata, 26.07.1978, A.B. Nenilin, 2 ♂♂ (ZMMU), Chatkalskii Reserve, Canyon Bash-Kyzyl-Sai, 18.09.1983, K.Y. Eskov. KAZAKHSTAN: 2 ♂♂ (ISE), Almaty Area, Talgar Distr., Kapchagayskoye Reservoir, 5.09.1983, Y.M. Marusik, 12 ♀♀ (ISE), same area, Chirchik Distr., 157th road-km from Almaty to Narynkol, Syugaty Mts., Yablonevaya Shchel, 22.04.1990, C.K. Tarabaev, 7 ♂♂, 1 ♀ (ISE), same place, Uzunagach, 12.05.1992, A.Z., 1 ♂ (ISE), 80-90 km NW of Almaty, Zail'skii Alatau Mt. Range, Bolshaya Almatinka River, 7.06.1993, S.O., 1 ♀ (ZISP), det. as *H. cambridgei*, Almaty Area, Semirechie, S. Spassky's Collection, 4 ♂♂, 1 ♀ (ISE), Shymkent (= Chimkent) Area, 5 km N of Chardara, 04.1993, D.L. & A.Z., 1 ♀ (ISE), Zhambyl (= Dzhambul) Area, 15 km NW of Kenen-Chu-Ilnskii Mts., 14.06.1990, A.Z., 7 ♀♀ (ISE), same area, Moynukum Distr., 6 km SE of Khantau, Khantau Mts., 10.85.1990, A.Z. & A. Fedorov, 1 ♀ (ISE), same area, Krasnogorsk Distr., 37 km NE of Gheorgievka, Pass Kurdat, 15.06.1990, A.Z. & A. Fedorov, 1 ♂ (ISE), Karatau Mt. Range, 9 km N of Achisay, 43°33'N, 68°53'E, 1200-1500 m alt., 12-13.05.1994, D.M.

Diagnosis. The ♀ of *H. potanini* is similar to that of *H. auratus*, but the insemination ducts, usually visible through translucent integuments, jutting out of the anterior edge of the epigynal depression in the former species (Fig. 123), and lying completely inside the depression in the latter one (Fig. 6). Besides that, the epigyne of *H. potanini* usually consists of two clearly visible depressions, while that of *H. auratus* often appears like a single wide depression (Figs 7, 8) [cf. Wesolowska, 1986: figs 634 and 738]. By the structure of the embolus, the ♂ of *H. potanini* can be mistaken for that of *H. patagius*, but it can be separated by the absence of a claw-shaped tibial apophysis (cf. Figs 126-128, 130-131 and 115-117).

Distribution. *H. potanini* is currently known from Middle and Central Asia only (Fig. 61). In Middle Asia, *H. potanini* has hitherto been reported from Kyrgyzstan [Nenilin, 1984b], W- and S-Kazakhstan [Logunov, 1992a, Zyuzin & Tarabaev, 1994].

Notes. There are two morphological varieties of *H. potanini* in the collections studied. The ♂♂ of one of these (the bulk) display a sharpened end of the embolus (Figs 126-127) and a dark brown coloration, while a single male showed a slightly broadened tip of the embolus and an almost yellow coloration (Figs 130-131). The record of the latter ♂ is arrowed in Fig. 61. At the moment it remains unclear whether it belongs to a separate species or is conspecific with *H. potanini*. Additional material is warranted to resolve the problem.

Description. MALE Measurements. Carapace 1.75 long, 1.45 wide, 0.85 high at PLE. Ocular area 0.70 long, 1.00 wide anteriorly and 1.10 wide posteriorly. Diameter of AME 0.34. Abdomen 2.00 long, 1.25 wide. Cheliceral



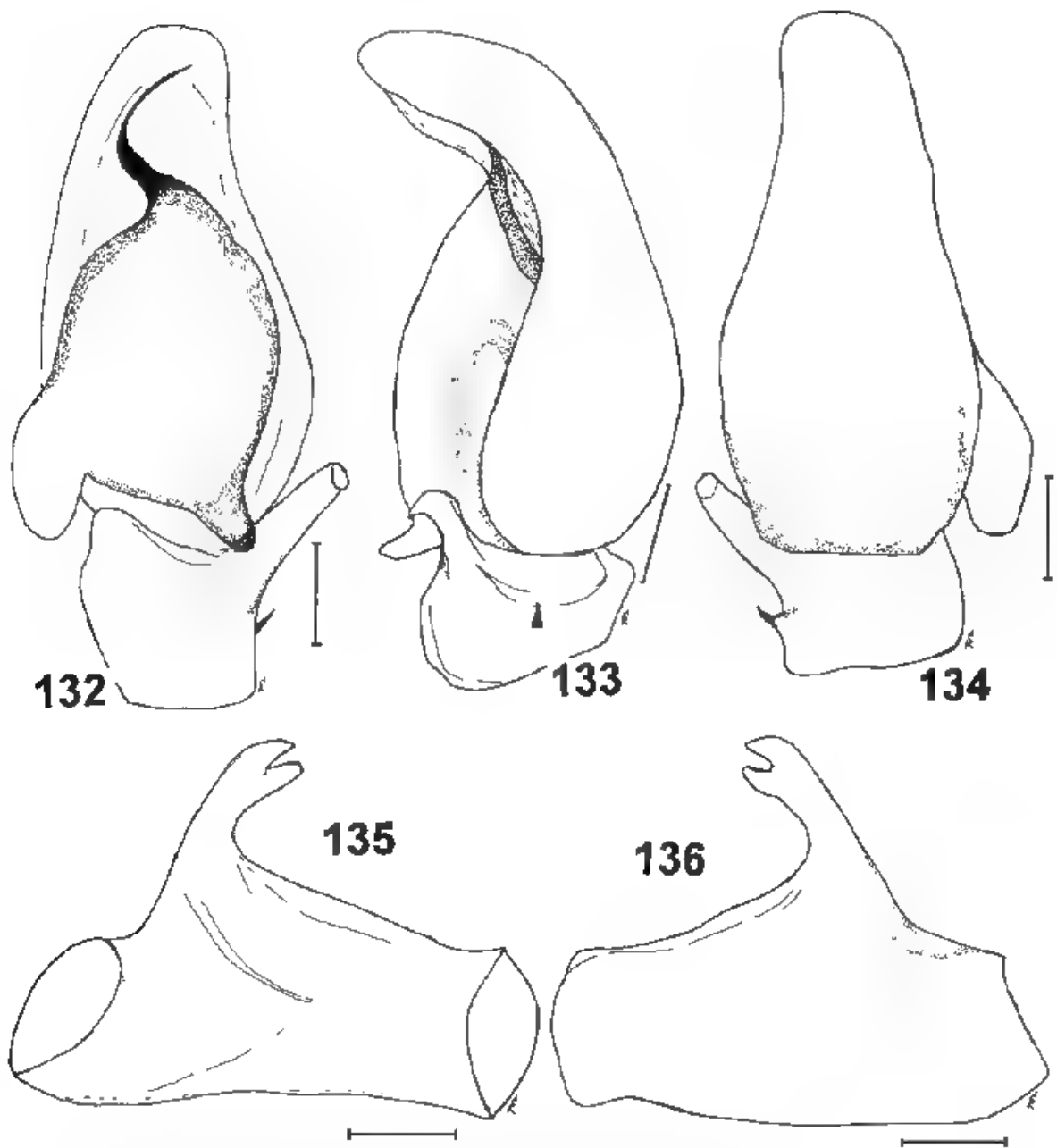
Figs 126-131 *Heliophanus potanini* Schenkel, 1963: 126, 130 — palpus, ventral view; 127, 131 — ditto, lateral view; 128 — ditto, dorsal view; 129 — palpus femur, medial view. Scale 0.1 mm.

Рис. 126-131 *Heliophanus potanini* Schenkel, 1963: 126, 130 — лапа, вентрально; 127, 131 — то же, латерально; 128 — то же, дорсально; 129 — бедро пальпы, медиально. Масштаб: 0,1 мм.

length 0.62. Length of leg segments: leg I 0.87 + 0.50 + 0.62 + 0.58 + 0.50; leg II 0.82 + 0.50 + 0.46 + 0.50 + 0.50; leg III 1.05 + 0.50 + 0.62 + 0.58 + 0.55; leg IV 1.10 + 0.50 + 0.75 + 0.75 + 0.62. Leg spination: Leg I Fm d 1-1-1, Tb pr 0-1, v 1-2, Mt v 2-2ap; Leg II Fm d 1-1-1 pr 1ap, Tb pr 1-1, and rt 1-1-1, v 1-2ap; Mt d 2-2

pr and rt 1ap, v 1-2ap; Leg IV Fm d 1-1-1, Tb pr 1-1 rt 1-1-1, v 1-2ap; Mt d 1-2-2ap; pr and rt 1ap, v 1-2ap. Coloration typical for *Heliophanus*. Legs brown. Palpal structure as in Figs 126-131.

FEMALE. Measurements. Carapace 2.00 long, 1.65 wide, 0.85 high at PLE. Ocular area 0.90 long, 1.25 wide anteriorly and 1.35 wide posteriorly. Diameter of AME



Figs 132-136. *Heliophanus turanicus* Charitonov, 1969: 132 — σ^7 pal.p, ventral view; 133 — ditto, lateral view; 134 — ditto, dorsal view; 135 — palpal femur, median view; 136 — ditto, lateral view. Scale 0.14 mm.

Рис. 132-136. *Heliophanus turanicus* Charitonov, 1969: 132 — палепа самца, вентрально; 133 — то же, латерально; 134 — то же, дорзально; 135 — бедро палепы, медиально; 136 — то же, латерально. Масштаб 0,14 мм.

0.30 Abdomen 3.50 long, 2.5 wide. Chel. ceral length 0.62. Length of leg segments: leg I 1.25 + 0.62 + 0.67 + 0.62 + 0.58, leg II 1.00 + 0.50 + 0.58 + 0.55 + 0.50, leg III 1.13 + 0.53 + 0.55 + 0.75 + 0.58, leg IV 1.50 + 0.55 + 1.25 + 1.13 + 0.60. Leg spination: Leg I Fm d 1 1-1, Tb pr 0-1, v 2-2, Mt v 2-2. Leg II Fm d 1 1-1, pr 1 ap, Tb pr 0-1, v 1-1, Mt v 2-2 ap. Leg III Fm d 1 1-1, pr 1 ap, Tb pr. and rt. 1 1, v 1 ap, Mt d 1 2 ap, pr. and rt 1 ap, v 1-2 ap. Leg IV Fm d 1 1 1, Tb pr. and rt 1 1, v 1 2 ap. Mt d 2 2 ap, pr. and rt 1 ap, v 1 2 ap. Coloration as in σ^7 . Epigyne and spermathecae as in Figs 123-125.

Heliophanus turanicus Kharitonov, 1969

Figs 21, 30, 55-56, 132-136

H. t. Kharitonov, 1969: 24-26, figs 13-14

H. t. Nencil.n 1984b: 137, 1984a: 19, 1985: 130; Mikhailov & Fet, 1994: 517; Wesolowska, 1996: 30, figs 15-16

H. hincventris Mikhailov & Fet, 1994: 517

Material: KYRGHYZSTAN: 1 σ^7 (ZISP), environs of Bishkek, 13.04.1980, S.Z., 1 σ^7 (ZMMU), same locality, Chu River Valley, Tokmak 20.05.1979, S.Z., 1 σ^7 (ZSP), Suzakskie Aqyry 10.04.1982, S.Z., 1 σ^7 (ISE), Dzalalabad Area, 13 km N of Tash-Kumyr Kara-Tyr 41°28'N 72°14'E, 18.23.05.1995 D.M., 1 σ^7 (ISE), same area,

Dzhany Dzha. Distr., 5 km SW of Kyzyl Dzhar, 22.06.1992, A.Z. 1 ♂ (ZISP) environs of Dzhalalabad, 30.4.1982, S.Z. — TAJIKISTAN: 1 ♂ (ZISP), Kurgan-Tyube Area, Karatau Mt. Range, 18.04.1986, S.Z., 2 ♂ (ZISP) W-Pamirs, confluence of Zhak and Prandzh rivers, 17.06.1971, Medvedev 1 ♂ (ZISP), Vosech 3.10.1975, Chernenko, 1 ♂ (ISE), Kurgan-Tyube Area, border of Yavan and Khabyshev districts, Shota Rustaveli, Chamsay Karatau Mt. Range, 18.04.1986, A.Z. & S.Z. 1 (ZMMU), same area, Aktau Mt. Range, Gandzhur o. 800 m alt., 19.04.1986, A.Z. 1 ♂ (ZISP), same locality 13.04.1986, S.Z., 1 ♂ 2 ♀ (SE), same locality 19.04.1991, S.O., 4 ♂ (ISE), Ramgontad(?) Mt. Range, ca. 2000 m alt., 29.04.1984, S.Z., 2 ♂ (ISE) Sanglok Mt. Range Substan, 3.05.1991, S.O. — KAZAKHSTAN: 3 ♂ (ISE) Kazakhstan Area, 102 km NW of Baurkum, 28.05.1993, A.Z., 2 (ISE), same area 37 km SW of Baurkum, 11.05.1995, A.Z., 3 ♂ 1 ♀ (ZMMU) 16 ♂ 18 ♀ (SE), same area, environs of Arys, 04-05.1988, 1989, D.L., 1 ♀ (ISE), same area, 67 km N of Chimaent 42°58'N, 69°38'E, 6.05.1994, D.M. — TURKMENISTAN: 11 ♂ 6 ♀ (ISE), Badkhyz Canyon Kyzyl-Dzhar and Kepele, 10.04.1993, D.L. & S.O., 1 ♂ (ISE), same locality 17.04.1984, Lyapunov, 1 ♂, 1 ♀ (ISE), Karatau Mt. Range, Astana Mt., 25-28.04.1991, S.O. 1 ♂ (ZISP det. as *H. lineiventris*), Bakharden, Kolkhoz Zhanova, 21.06.1977, V.Ya. Fet, 2 ♂ (ISE), 37 km SE of Polekhatum Zul'fagarskiy Mt. Range, 14.04.1993, S.O., 2 ♂ 1 ♀ (ISE), 20-25 km SE of Polekhatum, Ghezhgadyk Mt. Range 500-1000 m alt., 16.04.1993, D.L., 2 ♂ (SE), 58 km N of Guzhghy (= Kuzinka), Kala-i-Mor 8.04.1993, S.O., 1 ♂ (ZISP), 8 km N of Guzhghy, Morgunovka, 18.04.1977, M. Sternbergs, 1 ♂ (SE), same locality, 9.04.1993, S.Z. 1 ♂ (ISE), same area, 10-18 km N of Gyzghy, 9 km N of Chemen-Ibit, 18.04.1993, D.L. 1 ♂ (ISE), 8 km NE of Nebit-Dag, 380-1000 m alt., 24.04.1993, D.L. & A.Z. 2 ♂ 1 ♀ (ISE), SW Kopetdagh Kara-Kala 29.03.1993, S.O., 1 ♂ (ZISP), Khozi-Og i-Yaglam, 3.11.1993, K.O. Anger — UZBEKISTAN: 1 ♂ (PSU, lectotype, designated herein), 1 ♂ (PSU, palpless, paralectotype), Kashka Darynskaya Area Yakkabag, 29.03.1942, D.M. Fedotov 1 ♂ (PSU, paralectotype), same locality 31.10.1941, D.M. Fedotov, 2 ♂ 1 ♀ (ISE) Dzhirgatal'skaya Area near border with Samarkand Area, smanton 6.5.1990, A.Z. & A. Fedorov 2 ♂ 12 ♀ (ISE), S-Uzbekistan Babatag Mt. Range, Ak-Mecher, 28.04-10.05.1995, S.O., 1 ♂ (ISE), Samarkand Area Sovietnadi Distr. Zerafshansku Mt. Range, 2.5 km above Dzhana, 8.06.1991, A.Z. 2 ♂ (ISE), same area 1 km N of Katab, 26.04.1993, D.L. 2 ♂ (ZISP, Tasikent Area Dzhervin 4.09.1980, A.B. Nenlin

Diagnosis See comments under "Diagnosis of *H. choudensis*"

Distribution. This is a plain Turanian species (Fig. 21) originally described from Uzbekistan Yakkabag, Ugan and Agalyk [Kharitonov, 1969, Nenlin, 1984a] and hitherto recorded also from Kyrgyzstan environs of Bishkek, Tokmak, Dzhalaalabad [Nenlin 1984b] and Turkmenistan SW- and C-Kopetdagh and Badkhyz [Fet & Kuznetsov, 1982, Nenlin, 1984a, M.khaikov & Fet, 1994, Wesotowska, 1996]

Description MALE Measurements Carapace 2.24 long, 1.68 wide, 1.00 high at PLE. Ocular area 0.85 long, 1.15 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.35. Abdomen 2.75 long, 1.50 wide. Cheliceral length 1.00. Length of leg segments: leg I 1.35 + 0.75 + 1.15 + 0.75 + 0.65; leg II 1.25 + 0.65 + 0.65 + 0.70 + 0.60; leg III 1.10 + 0.54 + 0.75 + 0.70 + 0.65; leg IV 1.75 + 0.65 + 1.10 + 1.05 + 0.70. Leg spination. Leg I Fm d 1-1, pr 1ap, Tb pr 0-1, v 2-1, Mt v 2-2ap. Leg II Fm d 1-1-1, pr 1ap; Tb pr 1, v 1-1, Mt v 2-2ap. Leg III Fm d 1-1-1, pr 1ap, Tb pr and rt 1-1, v 2ap, Mt d 2-2ap, pr and rt 1ap, v 1-2ap. Leg IV Fm d 1-1-1 pr 1ap, Tb pr 1-1, v 1-2ap, Mt d 2-2ap, pr and rt 1ap, v 2ap. Coloration Carapace dark brown, sparsely covered with white scales. Eye field black. Sternum, maxillae and labium brown. Abdomen grey, venter with a pair of

white spots in front of spinnerets. Legs brown with lateral lines of white scales. Palpal structure as in Figs 132-136.

FEMALE Measurements Carapace 2.50 long, 1.94 wide, 1.00 high at PLE. Ocular area 0.90 long, 1.25 wide anteriorly and 1.50 wide posteriorly. Diameter of AME 0.35. Abdomen 4.00 long, 3.00 wide. Cheliceral length 0.85. Length of leg segments: leg I 1.25 + 0.70 + 0.42 + 0.75 + 0.65; leg II 1.00 + 0.70 + 0.75 + 0.70 + 0.60; leg III 1.25 + 0.65 + 0.67 + 0.85 + 0.75; leg IV 1.55 + 0.75 + 1.25 + 1.25 + 0.75. Leg spination. Leg I Fm d 1-1-1, pr 1ap, Tb pr 0-1, v 2-2, Mt v 2-2. Leg II Fm d 1-1-1, pr 1ap, Tb pr 1, v 1-1, Mt v 2-2ap. Leg III Fm d 1-1-1, pr 1ap, Tb pr and rt 1-1, v 1ap. Mt d 1-2ap, pr and rt 1ap, v 1-2ap. Leg IV Fm d 1-1-1, Tb pr and rt 1-1, v 1-2ap. Mt d 1-2ap, pr and rt 1ap, v 2ap. Coloration as in ♂ but lighter. Epigyne and spermathecae as in Figs 30-35-36.

Henophanus verus Wesotowska, 1986

Figs 114, 109-112, 137-139

H. v. Wesotowska, 1986: 223, fig. 789-792, 892.

H. ignorabilis Wesotowska, 1986: 214, figs 664-665 (in part, ♂ holotype only), syn. n.

Material. AZERBAIJAN: 8 ♂ (ISE), Lenkoran, Hyrcan Reserve, 20.06.1986, P.D., 3 ♂ 2 ♀ (ISE), same locality 18.06.1983, D.I.

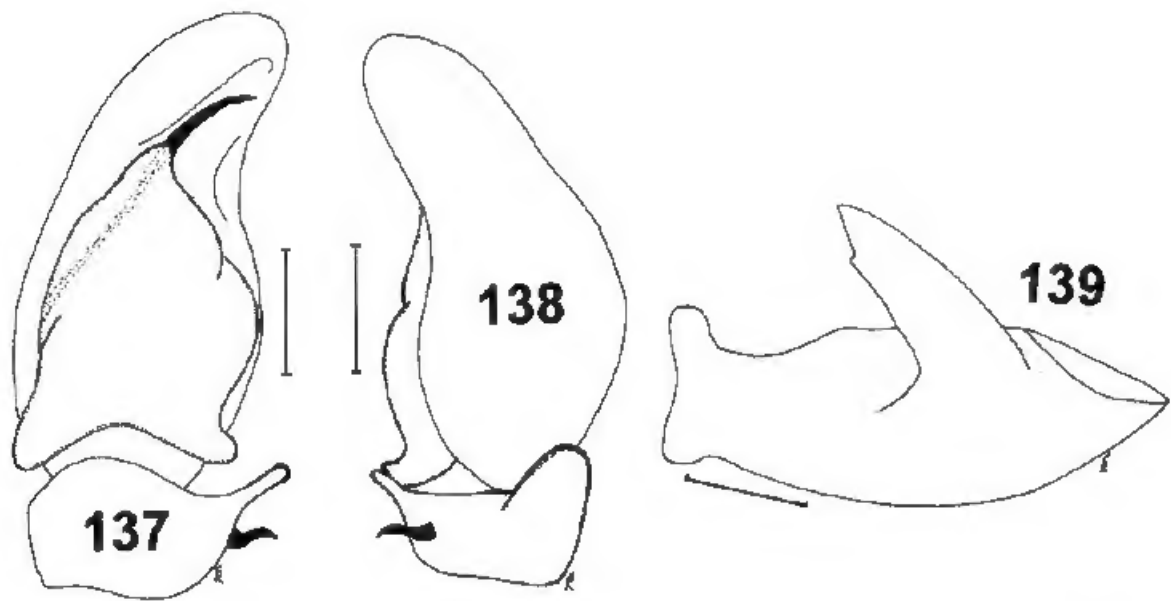
Diagnosis *H. verus* is closest to *H. mordax*. The ♀ can be only poorly separated by the structure of the spermathecae (Figs 110-111) and body coloration. The ♂ differs in the structure of the tibial apophysis and femoral process (cf. Figs 102-106 and 137-139).

Distribution Azerbaijan (Lenkoran) and Iran (Elburs) (Fig. 114).

Notes. According to Wesotowska's data [1986: 214, figs 664-665] the holotype of *H. ignorabilis* Wesotowska, 1986, deriving from Iran (Elburs, Mazandaran) seems to actually represent a ♀ of *H. verus* (cf. Figs 109-111). Thus, *H. ignorabilis* should be considered as a junior synonym of *H. verus* rather than of *H. mordax*, as it has been stated recently by Wesotowska [1996].

Description MALE Measurements Carapace 1.75 long, 1.25 wide, 0.75 high at PLE. Ocular area 0.60 long, 0.90 wide anteriorly and 1.00 wide posteriorly. Diameter of AME 0.35. Abdomen 1.75 long, 1.00 wide. Cheliceral length 0.50. Length of leg segments: leg I 0.66 + 0.42 + 0.62 + 0.47 + 0.42; leg II 0.62 + 0.38 + 0.50 + 0.38 + 0.45; leg III 0.66 + 0.38 + 0.50 + 0.60 + 0.50; leg IV 1.00 + 0.50 + 0.66 + 0.66 + 0.50. Leg spination. Leg I Fm d 1-1-1, pr 1ap, Tb pr 0-1, v 1-1, Mt v 2-2ap. Leg II Fm d 1-1-1, pr 1ap, Tb pr 0-1, v 1-1, Mt v 2-2ap. Leg III Fm d 1-1-1, pr and rt 1ap, Tb pr 1-1, rt 1-1-1, v 2ap, Mt d 2ap, pr and rt 1ap, v 2ap. Leg IV Fm d 1-1-1 pr and rt 1ap, Tb pr and rt 1-1, v 1-2ap, Mt d 2-2ap, pr and rt 1ap, v 1-2ap. Coloration Carapace dark brown. Eye field black. Sternum and chelicerae dark brown. Maxillae brown. Labium black. Abdomen grey. Legs brown with dorsal longitudinal lines, but tarsi and metatarsi yellow. Palpal structure as in Figs 137-139.

FEMALE Measurements Carapace 2.25 long, 1.65 wide, 1.00 high at PLE. Ocular area 0.75 long, 1.25 wide anteriorly and 1.30 wide posteriorly. Diameter of AME 0.35. Abdomen 3.75 long, 2.35 wide. Cheliceral length 0.65. Length of leg segments: leg I 1.00 + 0.62 + 0.67 + 0.62 + 0.50; leg II 0.87 + 0.55 + 0.66 + 0.50 + 0.62; leg III 1.3 + 0.50 + 0.62 + 0.66 + 0.62; leg IV 1.38 + 0.62



Figs 137-139. *Heliophanus verus* Wesolowska, 1986: 137 — ♂ palpus, ventral view; 138 — ditto, lateral view; 139 — palpal femur, lateral view. Scale: 0.14 mm.

Рис. 137-139. *Heliophanus verus* Wesolowska, 1986: 137 — палепа ♂, вентрально; 138 — то же, латерально; 139 — бедро палепы, латерально. Масштаб: 0,14 мм.

+ 1.00 + 1.13 + 0.62. Leg spination. Leg I: Fm d.1-1-1; Tb v.2-2; Mt v.2-2ap. Leg II: Fm d.1-1-1; Tb pr.0-1, v.1-1; Mt v.2-2ap. Leg III: Fm d.1-1-1, pr.1ap.; Tb pr.1-1, rt.1-1-1, v.1-1ap.; Mt d.2-2ap., pr. and rt.1ap., v.1-2ap. Leg IV: Fm d.1-1-1; Tb pr.1-1, rt.1-1-1, v.1-2ap.; Mt d.1-2-2ap., pr. and rt.1ap., v.1-2ap. Coloration as in ♂ but lighter. Legs yellow. Epigyne and spermathecae as in Figs 109-111.

Heliophanus wesolowskiae sp.n.

Figs 140-145.

Material. Holotype: 1 ♂ (ISE), KYRGHYZSTAN, Chon-Kurchak, 7.07.1986, S.O.; 1 ♀ (ISE), Zaalaitskii Mt. Range, 20 km W of Daraut-Kurgan, 9.07.1995, S.O.

Paratypes: KYRGHYZSTAN: 1 ♀ (ISE), together with holotype, 1 ♀ (ZMMU), E of Lake Issyk-Kul, Taldysu, 7.07.1995, S.O. — KAZAKHSTAN: 1 ♀ (ZMMU), Zailiiskii Alatau Mt. Range, Canyon Asy, 6.07.1993, S.O.

Diagnosis. The ♂ of *H. wesolowskiae* is closest to that of *H. cupreus*, but it can be separated by the longer tibial apophysis, shorter embolus, and shape of the tegulum (cf. Figs 22-23 and 140-141). At the same time, the ♀ displays easily distinguishable genitalia, i.e. the epigynal plate is visibly jutting out of the epigastric furrow (Figs 144-145).

Distribution. E-Kazakhstan and Kyrgyzstan (Fig. 75).

Description. MALE. Carapace 2.50 long, 1.55 wide and 1.00 high at PLE. Abdomen 2.04 long, 1.50 wide. Cheliceral length 0.75. Ocular area 0.75 long, 1.13 wide anteriorly and 1.00 wide posteriorly. Diameter of AME 0.38. Length of leg segments: leg I: 1.00 + 0.58 + 0.75 + 0.50 + 0.58; leg II: 0.87 + 0.45 + 0.60 + 0.50 + 0.50; leg III: 1.00 + 0.50 + 0.55 + 0.67 + 0.50; leg IV: 1.12 + 0.50 + 1.00 + 1.00 + 0.62. Leg spination. Leg I: Fm d.1-1-1, pr.1ap.; Tb v.1-1; Mt v.2-2ap. Leg II: Fm d.1-1-1, pr.1ap.; Tb v.1-1; Mt v.2-2ap. Leg III: Fm d.1-1-1, pr.1ap.; Tb pr.0-1, rt.1-1-1, v.2ap.; Mt d.2ap., pr. and

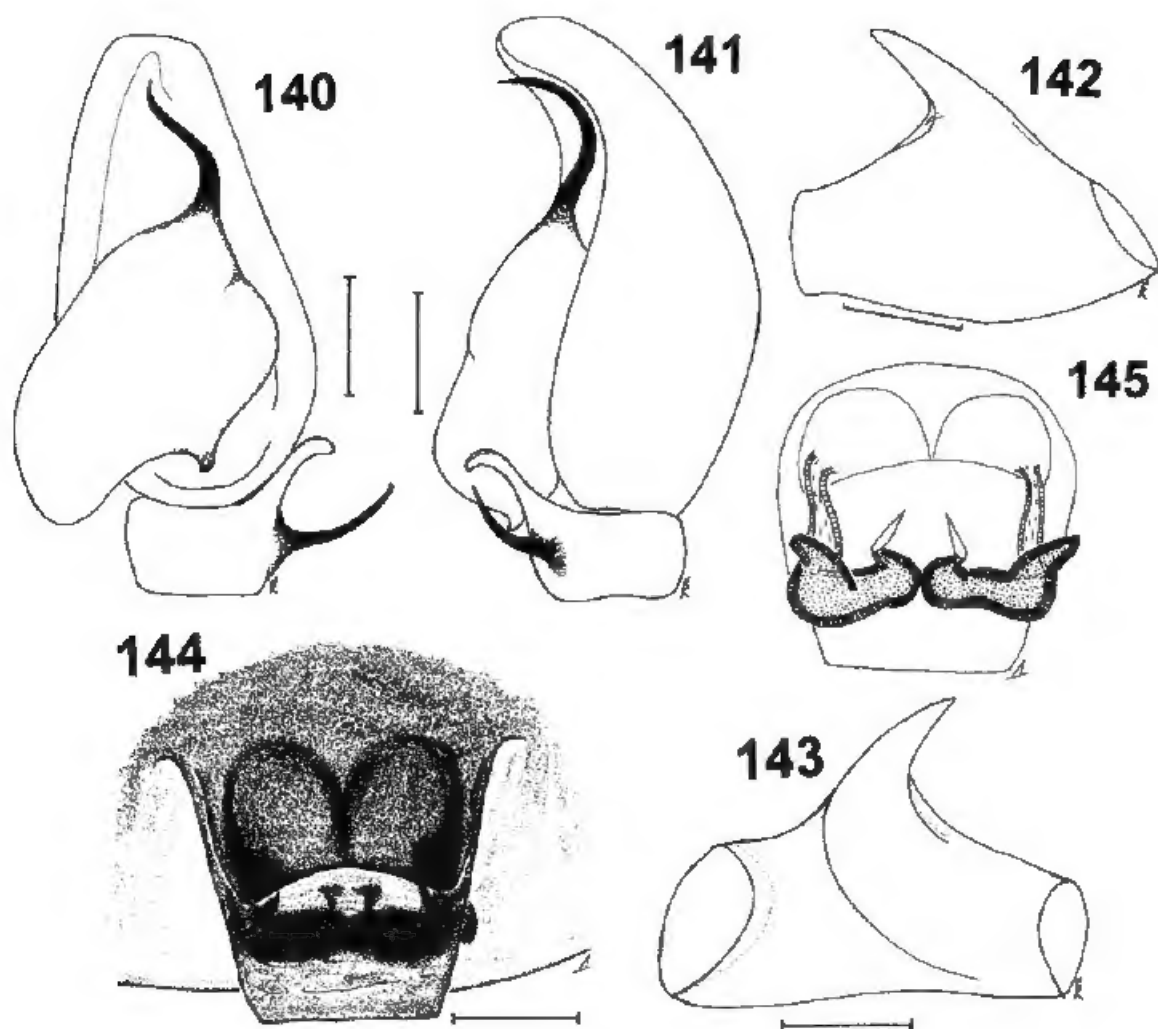
rt.1ap., v.1-2ap. Leg IV: Fm d.1-1-1, pr.1ap.; Tb pr. and rt.1-1-1, v.1-1ap.; Mt d.2-2ap., pr. and rt.1ap., v.2ap. Coloration. Carapace dark brown, eye field with light spots. Abdomen grey. Dorsum with a small group of white hairs anteriorly. Venter without colour marking. Legs light brown. Palpal structure as in Figs 14-143.

FEMALE. Carapace 2.00 long, 1.38 wide and 1.00 high at PLE. Abdomen 5.63 long, 3.00 wide. Cheliceral length 0.75. Ocular area 0.75 long, 1.12 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.30. Length of leg segments: leg I: 1.07 + 0.62 + 0.70 + 0.62 + 0.58; leg II: 1.00 + 0.55 + 0.60 + 0.50 + 0.50; leg III: 1.13 + 0.58 + 0.62 + 0.67 + 0.62; leg IV: 1.50 + 0.62 + 1.00 + 1.00 + 0.65. Leg spination. Leg I: Fm d.1-1-1, pr.1ap.; Tb pr.0-1, v.1-1; Mt v.2-2ap. Leg II: Fm d.1-1-1, pr.1ap.; Tb v.1-1; Mt v.2-2ap. Leg III: Fm d.1-1-1, pr.1ap.; Tb pr.0-1, rt.1-1, v.1ap.; Mt d.1-2ap., pr.1-1ap., v.2ap. Leg IV: Fm d.1-1-1, pr.1ap.; Tb pr.0-1, rt.1-1, v.1-1; Mt d.0-1-0, v.0-1-0, 6ap. Coloration. Carapace dark brown, bordered by a grey band. Eye field black. Maxillae and labium brown with yellow tips. Sternum grey. Abdomen: Dorsum grey, covered with white hairs anteriorly and laterally; venter with a pair of white spots in front of spinnerets. Legs yellow. Coxae with dorsal grey patches. Femora and tibiae with lateral, dark brown, longitudinal lines, with apical ends being dark brown too. Epigyne and spermathecae as in Figs 144-145.

Name. Honours the well-known Polish arachnologist, Dr. W. Wesolowska, the author of a very useful world-wide revision of *Heliophanus* that has strongly facilitated the current study.

Doubtful and erroneous records

1. *Heliophanus aeneus* (Hahn, 1831). Repeatedly



Figs 140-145. *Heliophanus wesolowskiae* sp.n.: 140 — ♂ palp, ventral view; 141 — ditto, lateral view; 142 — palpal femur, lateral view; 143 — ditto, median view; 144 — epigyne; 145 — spermathecae, dorsal view. Scales 0.14 (140-143) & 0.1 mm (144-145).

Рис. 140-145. *Heliophanus wesolowskiae* sp.n.: 140 — палепа ♂, дентрально; 141 — то же, латерально; 142 — бедро палепы, латерально; 143 — то же, медиально; 144 — эпигина; 145 — сперматека, вид дорсально. Масштаб: 0,14 (140-143) и 0,1 мм (144-145).

reported from Middle Asia [Kroneberg, 1875; Spassky & Shnitnikov, 1937; Andreeva, 1975, 1976; Zonshtein, 1984; Gafarov, 1987]. However, we have been unable to spot this species among the vast *Heliophanus* materials (re-) examined during the current study. Thus, we assume these authors might have actually dealt either with *H. auratus* (♂) or with *H. potanini* (♀).

2. *Heliophanus melinus* L. Koch, 1867. All records of this species in the Caucasus [Minoranskii et al., 1984] and Middle Asia, e.g. by Simon [1899], Nenilin [1984a, 1985] and Fet [1983], seem to belong either to *H. patagiatus* or to *H. dubius*.

3. *Heliophanus minutissimus* Simon, 1871. Reported from the Caucasus by Nenilin [1985]. However, this species was described by Simon based on juveniles deriving from the Crimean Peninsula (instead of the Caucasus, as stated by Nenilin [1985]). The species should be considered as *anomen dubium* [s. Wesolowska, 1986: 232].

4. *Heliophanus niveiventris* Simon, 1889. This species

is considered as a *nomen dubium* [s. Wesolowska, 1986; 1996].

5. *Heliophanus rufithorax* Simon, 1868. All records in Middle Asia by Kroneberg [1875], Kharitonov [1932] and Nenilin [1984a, 1985] require confirmation upon pertinent material [s. Wesolowska, 1996].

6. *Heliophanus simplex* Simon, 1868. Reported by Savelieva [1970; 1979] from E-Kazakhstan. Yet most probably this record belongs either to *H. dubius* or to *H. patagiatus*, as *H. simplex* is restricted to the southern regions of C-Europe only [Wesolowska, 1986: fig. 899]. *H. simplex* was also reported from Azerbaijan [Dunin & Mamedov, 1992] and Chechnya [Minoranskii et al., 1984], but beyond any doubt, these authors actually dealt with *H. equester* (♂) (Dunin's material re-examined!). The occurrence of *H. simplex* in E-Kazakhstan and/or the Caucasus thus requires confirmation upon pertinent material.

7. *Heliophanus tribulosus* Simon, 1868. Recorded from the Almaty Area by Spassky & Shnitnikov [1937: as *H. cambridgei*], Tarabaev [1979] and Prószyński [1979:

figs 117-118], the latter author after having restudied the ♀ referred to by Spassky & Shnitnikov. A new re-examination of Spassky's original specimen leaves no doubt, these authors actually dealt with a ♀ of *H. potanini*. On the other hand, *H. tribulosus* is known to be restricted to S-Europe only and displays such an extremely peculiar structure of the genitalia [Wesołowska, 1986: figs 492-502, 898] that it prevents possible misidentifications. *H. tribulosus* has been reported also from the Caucasus [Dunin & Mamedov, 1992]. However, among the Caucasian salticids handed to us by Dr. P.M. Dunin, we have found no *H. tribulosus*. The only vial containing a ♀ previously determined by Dunin as *H. tribulosus* appears to belong in fact to *H. mordax*. Hence the occurrence of *H. tribulosus* in the Caucasus requires confirmation upon pertinent material.

Acknowledgements

We wish to express our warmest thanks to the following persons who contributed specimens for this study: Dr. A.A. Zyuzin (Alma-Ata), Dr. P.M. Dunin (Togliatti), Mr. O.V. Lyakhov (Pavlodar), Mr. S.V. Ovtchinnikov, Dr. S.L. Zonshtein and Mr. D.A. Milko (the three latter from Bishkek). Our special thanks are extended to Dr. K.G. Mikhailov, of the ZMMU, Dr. S.L. Eyunin, of the PSU, and Dr. V.I. Ovtsharenko, of the ZISP, for the opportunity to study some museum materials under their care. Dr. V.V. Dubatolov (Novosibirsk) has kindly rechecked the Middle Asian locality spellings. We are much obliged also both to Dr. S.I. Golovatch (Moscow) for his linguistic help, and again to Dr. K.G. Mikhailov (ZMMU), for his help in compiling the reference list of the present work. This work has been supported in part by the International Science Foundation, grants RA6000 and RA6300.

References

- Alimdzhanov R.A. & Bronshtein T.G. 1956. [Invertebrate animals of the Zeravshan Valley]. Tashkent-Samarkand: AN UzSSR, 348 pp. [in Russian].
- Andreeva E.M. 1975. Distribution and ecology of spiders (Aranei) in Tajikistan // *Fragm. faun.* T.20. No.19. P.325-352.
- Andreeva E.M. 1976. [Spiders of Tajikistan]. Dushanbe: Donish, 195 pp. [in Russian].
- Bronshtein T.G. & Murtazaev A.B. 1974. [Materials on the spider fauna of the Samarkand Area] // *Voprosy zashchity rastenii. Trudy Uzbekskogo univ., Novaya seriya. Vyp.247.* P.124-143 [in Russian].
- Dunin P.M. 1979. [Materials on the spider fauna (Salticidae) of Azerbaijan] // *Uchyonye zapiski Azerbaidzhan. univ. (Biol.).* No.1. P.35-40 [in Russian].
- Dunin P.M. 1984. [Fauna and ecology of spiders (Aranei) of the Apsheron Peninsula (Azerbaijan SSR)] // *Fauna i ekologiya paukooobraznykh* (Ed. A.S. Utotchkin). P.45-60. Perm [in Russian].
- Dunin P.M. 1989. [Fauna and altitudinal distribution of spiders (Arachnida, Aranei) of the Azerbaijan part of the southern slope of the Caucasus Major] // *Fauna i ekologiya paukov i skorpionov* (Ed. A.B. Lange). Moscow: Nauka. P.31-39. [in Russian].
- Dunin P.M. & Mamedov A.A. 1992. [Spiders of cotton fields of the southeastern part of Azerbaijan] // *Byul. MOIP. Biol.* T.97. No.6. P.53-61 [in Russian].
- Fet V.Ya. 1983. [The fauna of Aranei of the southwestern Kopetdag] // *Ent. obozr.* T.62. No.4. P.835-845 [in Russian].
- Fet V.Ya. & Kuznetsov G.T. 1982. [On zoogeographical connections of the spider fauna of the Kopetdag] // *Respubl. nauchno-teoreticheskaya konf. molodykh uchyonykh i spetsyaliastov Tajikskoi SSR, posvyashennoi XXVI s'ezdu KPSS* (Tezisy dokladov, sektsiya zoologii). Dushanbe. P.59-61 [in Russian].
- Gafarov S. 1987. [Predators and parasites of the hoverflies (Diptera, Syrphidae) in Tajikistan] // *Izv. AN Tadzh. SSR, Otd. biol. nauk. Vyp.2(107).* P.81-83 [in Russian].
- Harm M. 1971. Revision der Gattung *Heliophanus* C.L. Koch (Arachnida: Araneae: Salticidae) // *Senckenberg. biol. Bd.52. Hft.1/2.* S.53-79.
- Kharitonov D.E. 1932. Katalog der russischen Spinnen. Leningrad: AN SSSR, 206 pp.
- Kharitonov D.E. 1969. [Materials on the spider fauna of the USSR] // *Uchyonye zapiski Permskogo gos. univ., Biol.* T.179. P.59-132 [in Russian].
- Kroneberg A.I. 1875. [Fedtchenko's voyage to Turkestan. Spiders. Araneae] // *Izv. Obsh. Ljub. Estestv. Antrop. Etnogr.* T.19. No.3. P.I-IV. 1-55 [in Russian].
- Kulczyński. 1895. Araneae a Dre G. Horvath in Bessarabia, Chersoneso Taurico, Transcaucasia et Armenia Rossica collectae // *Term. Fuz. Vol.18.* P.3-38.
- Logunov D.V. 1992. Salticidae of Middle Asia (Aranei). I. New species from the genera *Heliophanus*, *Salticus* and *Sitticus*, with notes on new faunistic records of the family // *Arthropoda Selecta. Vol.1. No.1.* P. 51-67.
- Mikhailov K.G. & Fet B.Ya. 1994. Fauna and zoogeography of spiders (Aranei) of Turkmenistan // *Biogeography and Ecology of Turkmenistan.* (V. Fet & K. L. Atamuradov Eds.). Kluwer Acad. Publ. P.499-524.
- Minoranskii V.A. 1988. [Materials on the spider fauna of Checheno-Ingushetiya] // *Fauna i ekologiya paukooobraznykh. Perm: Perm University.* P.34-42 [in Russian].
- Minoranskii V.A., Ponomarev A.V., Slyusarev V.V. & Gramotenko V.P. 1984. [On the spider fauna of Checheno-Ingushetiya] // *Izv. Severo-Kavkazskogo nauchnogo tsentra vysshei shkoly estestvennykh nauk. Vyp.4.* P.76-81 [in Russian].
- Mkheidze T.S. 1964. [Spiders] // *Zhyvotnyi mir Gruzii. T.2. Chlenistonoghiy.* Tbilisi: AN Gruz. SSR. P.48-116 [in Georgian].
- Nenilin A.B. 1984a. [Materials on the fauna of the spider family Salticidae of the USSR. I. Catalogue of Salticidae of Middle Asia] // *Fauna i ekologiya paukooobraznykh.* (Eds. A.S. Utotchkin et al.). Perm. P.6-37 [in Russian].
- Nenilin A.B. 1984b. [Materials on the fauna of the spider family Salticidae of the USSR. III. Salticidae of Kirghizia] // *Entom. issled. v Kirghizii.* (Ed. A.I. Protsenko). No.7. Ilym Publ. Frunze. P.132-143. [in Russian].
- Nenilin A.B. 1985. [Materials on the fauna of the spider family Salticidae of the USSR. II. Results of the study in the USSR] // *Fauna i ekologiya paukov SSSR.* (Ed. V.I. Ovtsharenko). Trudy Zool. inst. Leningrad. T.139. P.129-134. [in Russian].
- Ono H. 1988. A revisional study of the spider family Thomisidae (Arachnida, Araneae) of Japan. Tokyo: National Science Museum. 252 pp.
- Ovtsharenko V.I. 1978. [Spiders of the family Salticidae (Aranei) from the Caucasus Major] // *Entom. obozr.* T.56. No.3. P.682-686 [in Russian].
- Pavlenko T.V. 1985. [Spatial distribution of spiders in the natural complexes of the Barsakelmes Island (Aral Sea)] // *Fauna i ekologiya paukov SSSR.* (Ed. V.I. Ovtsharenko). Trudy Zool. inst. Leningrad. T.139. P.147-155 [in Russian].
- Prószyński J. 1976. Studium systematyczno-zoogeograficzne nad rodziną Salticidae (Aranei) regionów Palearktycznego i Nearktycznego. Siedlce: Rozprawa Naukowa, WSRP, 260 pp [in Polish].
- Prószyński J. 1979. Systematic studies on East Palaearctic Salticidae III. Remarks on Salticidae of the USSR // *Ann. Zool. PAN.* T.34. P.299-369.

- Prószyński J. 1982. Salticidae (Araneae) from Mongolia // Ann. hist. nat. Mus. natn. Hung. T.74. P.273-294.
- Prószyński J. 1990. Catalogue of Salticidae (Araneae). Synthesis of quotations in the world literature since 1940, with basic taxonomic data since 1758. Siedlce: WSRP. 366 pp.
- Savelieva L.G. 1970. [Fauna and zoogeographic connections of spiders of the East Kazakhstan Area] // Biologiya i gheografiya. T.6. P.78-88 [in Russian].
- Savelieva L.G. 1976. [Zonal-habitat distribution of spiders in the territory of the East Kazakhstan Area] // Biol. nauki. Alma-Ata: Kazakhstan. pedag. inst. Vyp.1 (1974). P.50-54 [in Russian].
- Savelieva L.G. 1979. [Zoogeographic spider complexes (Aranei) from East Kazakhstan] // Priroda i khozyaistvo Vostochnogo Kazakhstana. Alma-Ata: Nauka. P.139-148 [in Russian].
- Savelieva L.G. 1990. [Salticidae (Araneae) from the upper Irtysh region] // Okhrana okruzhayushchei sredy i prirodopolzovanie Priirtyshya. Tezisy, No.2. Ust-Kamenogorsk. P.172-174 [in Russian].
- Simon E. 1901. Histoire Naturelle des Araignées. T.2. Paris. P.381-668.
- Spassky S.A. 1937. [Material on the spider fauna of the Black Sea coast] // Sbornik nauchno-issledovatel'skikh rabot Azovo-Chernomorskogo sel'khozinstituta. Vyp.5. P.131-138 [in Russian].
- Spassky S.A. & Shnitnikov V.N. 1937. [Materials on the spider fauna of Kazakhstan] // Trudy Kazakhskogo filiala AN SSSR. T.2. P.265-300 [in Russian].
- Tarabaev C.K. 1979. [Spiders inhabiting the crowns of apple-trees in the foothills of Zailiiskii Alatau] // Novosti entomol. Kazakhstana. Deposited in VINITI 3415-79. P.119-125 [in Russian].
- Wesolowska W. 1986. A revision of the genus *Heliophanus* C.L. Koch, 1833 (Araneae: Salticidae) // Ann. Zool. PAN. T.40. P.1-254.
- Wesolowska W. 1996. New data on the jumping spiders of Turkmenistan (Salticidae) // Arthropoda, Selecta. Vol.5. Nos1/2. P.17-53.
- Yakhontov V.V. 1955. [Arthropodocenoses of the lucerne fields in the north of Uzbekistan. I. Order Aranei — Spiders] // Zool. zhurnal. T.34. No.2. P.359-364 [in Russian].
- Zonshrein S.L. 1984. [On the fauna and ecology of spiders (Aranei) of the low layers of the walnut-fruit-tree forests of southern Kyzghyzstan] // Entom. issled. v Kirghizii. (Ed. A.I. Protsenko). No.17. Frunze: Ilym Publ. P.144-151 [in Russian].
- Zyuzin A.A. & Tarabaev C.K. 1994. The spiders and scorpions inhabiting Ustyurt Plateau and Mangyshlak Peninsula (South-Western Kazakhstan) // Boll. Accad. Gioenia Sci. Nat. T.26 (1993). No.345. P.395-404.
- Zyuzin A.A., Tarabaev C.K. & Fyodorov A.A. 1994. [The spiders (Arachnida: Araneae) collected in the eastern part of Kyzylkum Desert and the eastern surroundings of Aral Sea] // Selevinia. Vol.1. P.3-11 [in Russian].